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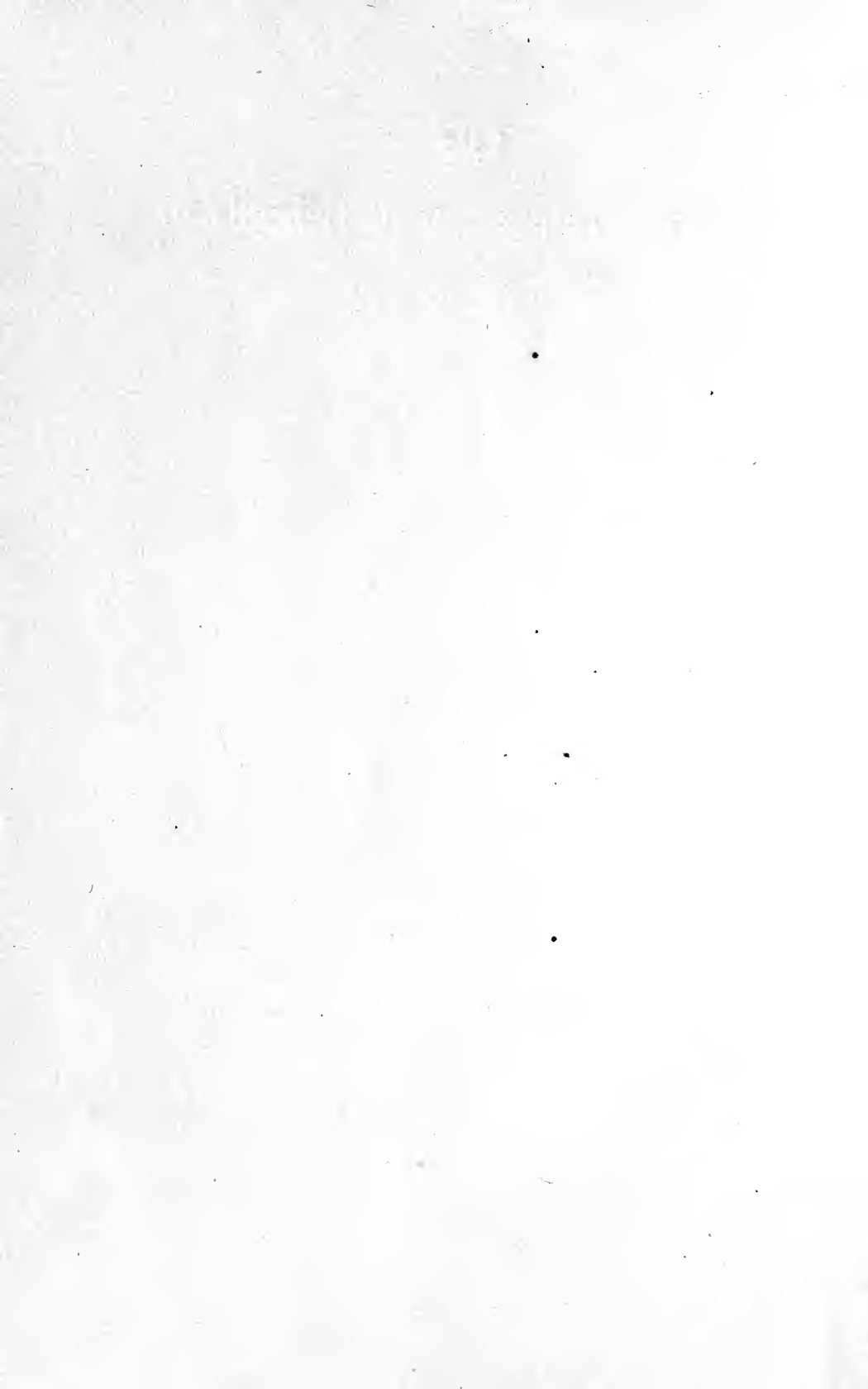
The
Industrial Improvement Schools of
Wuerttemberg

By
Albert A. Snowden

Submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy
in the Faculty of Philosophy
of Columbia University

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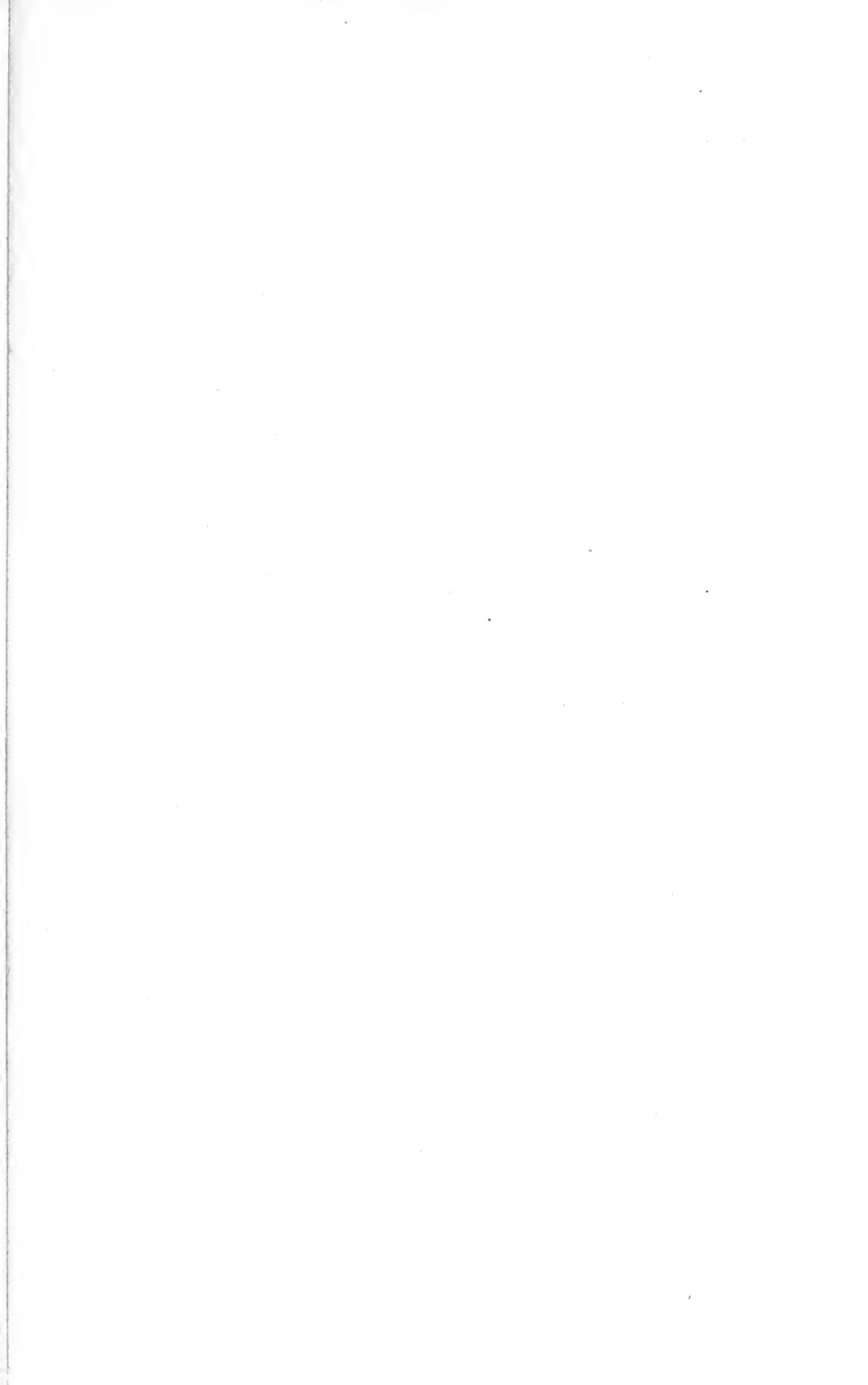
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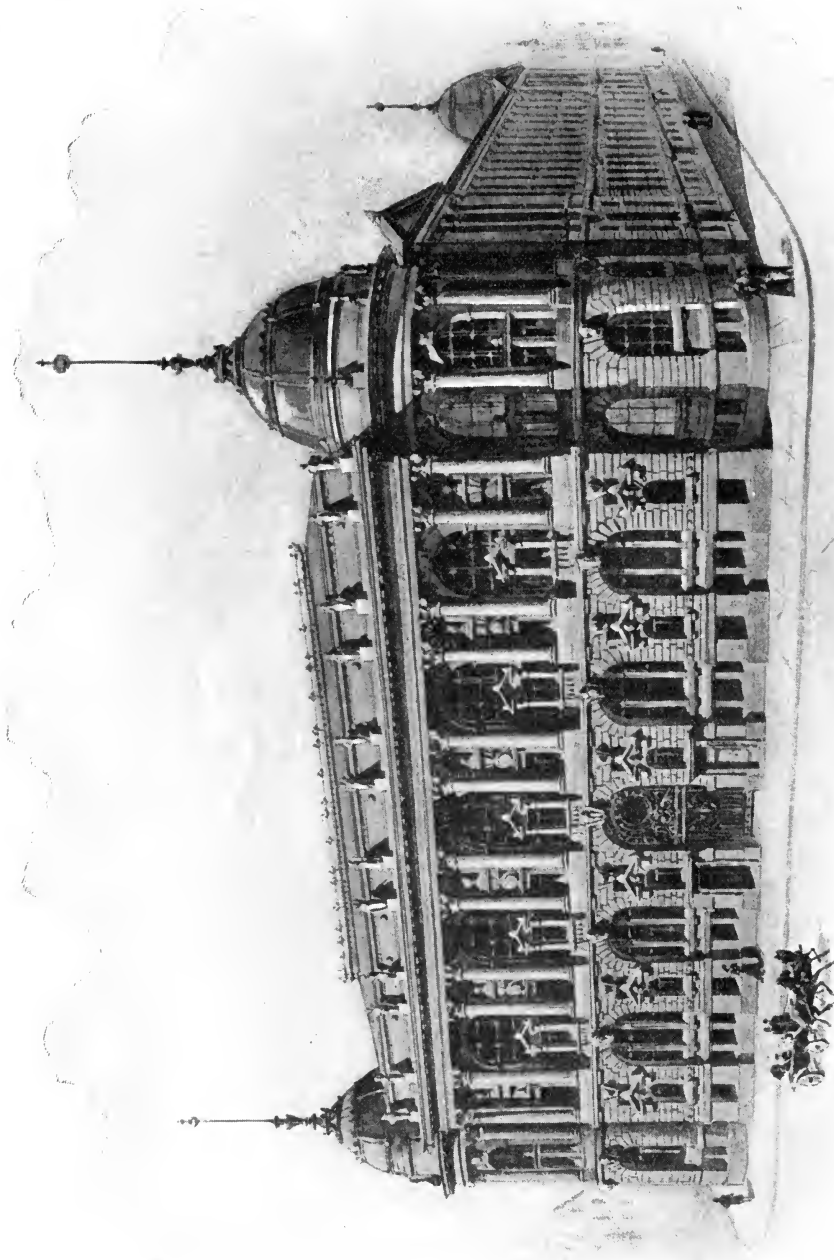
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STATE INDUSTRIAL MUSEUM AT STUTTGART.



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FOREWORD

At the present time few matters pertaining to education have more significance for Americans than those which reveal the accomplishments of the modern German nation, and perhaps no feature of German educational progress means more to us to-day than that which pertains to vocational training.

The memoir which is here printed is a study of the system of industrial and vocational schools in one of the smaller kingdoms of the German Empire. It sets forth briefly the economic conditions which hold in the kingdom of Wuerttemberg, the natural resources of the country and the system of transportation. It then traces the development in this environment of the system of industrial schools and the service which they render in the up-building and maintenance of the state.

Such a study seems to me particularly opportune and the reading of this report answers the questions which the American is likely to ask. He desires to know how such schools arose, what the different kind of schools are, how the pupil is steered into them, and what part the vocational training plays in his preparation for life. In describing one of the smaller kingdoms of Southern Germany, Mr. Snowden has here made it possible for the American reader to understand and to trace the development of industrial education and the function which it plays in an agricultural and manufacturing state as he can only understand it by reading the actual story of some one of these states.

HENRY S. PRITCHETT.

PREFACE

The report herewith presented is the outcome of some weeks spent in Wuerttemberg, during an investigation of vocational training in Europe. Although many other states abroad have made noteworthy provisions to secure greater industrial efficiency, it is the writer's belief that on the whole Wuerttemberg offers the experience most fruitful for our consideration at present. To be sure we do not have here a young giant of the democracies, rich in undeveloped resources, with the means within easy reach to recoup any youthful extravagances, but, rather, a tight-skinned monarchy that was in danger of paresis over a half-century ago, and almost as populous then as it is now. Moreover, fate had set it down in a hilly region that seems vastly more like a pleasant place to live in than a good place to get a living. Indeed, the fierce economic struggle of the early days drove thousands of Wuerttemberg citizens into permanent exile from the Fatherland. During the first five years of the last half-century the kingdom actually witnessed a diminution of sixty thousand in the total population. It was said that the country was overcrowded.

Wuerttemberg had long been in the lead among the Teutonic states for general culture in education, a notable achievement, perhaps unappreciated abroad because of the political ascendancy of Prussia. Still the population was too dense. Finally, those statesmen who had maintained that industrial efficiency makes its own elbow-room in the world were allowed to take such steps as would provide a broad vocational training for every one in the kingdom who could take advantage of the opportunity. Gradually but surely the country evolved within itself the elements of commercial stability and economic independence that have placed it in the front rank of nations. The tide of

emigration has been checked, the population has increased rapidly, and the whole land shows evidence of general prosperity. Also there is more room than ever before. The story of this development, full of suggestiveness for America, is the theme of the following chapters. The chief institutions concerned are the industrial improvement schools, and the Central Bureau for Industry and Commerce (*Zentralstelle fuer Gewerbe und Handel*) a branch of the Interior Ministry. During an active career, three years of which were spent in the Orient as legal adviser to the Japanese government, its president, Ritter von Mosthaf, has been able to perform services for his country that are nothing short of wonderful. Moreover they have met with the high approval of king and commoner. The new National Industrial Museum (*Landesgewerbemuseum*) at Stuttgart, an institution that is worth going around the world to see, is one of the monuments of his sagacity. Another important accomplishment for which he has earned the greatest credit is the new law governing the reorganization of the industrial improvement schools. Since the details of this law are all set forth in Chapter III, it is unnecessary to print the text of this brief enactment in the report.

While it might have been more desirable, from the point of view of sequence in time, to have introduced the historical chapter (II) at the outset, it has seemed to me that the reader would appreciate first a summary statement of what Wuerttemberg has actually accomplished by means of its system of vocational training. The historical chapter, however, finds its justification and interest in the fact that it gives a brief outline of the battles that have been fought in the past for industrial betterment through training, and by so doing may offer some guidance to us who have just entered upon a similar struggle to secure greater average efficiency in America.

The present monograph is an abridgment of the chapters on industrial training in a work on "The Schools of Wuerttemberg," to be issued at another time. Written some months ago, the present treatise was accepted for publication by a society of national scope, but through the error of an officer in that society publication was delayed during my absence in Europe. A similar monograph, written by myself, is appearing, however, in the *School Journal*.

I am under especial obligations to President von Mosthaf, who not only furnished me with a number of helpful state documents, but also generously answered questions as to the working of the system of industrial schools and allied problems on many occasions.

It also gives me great pleasure at this time to acknowledge the helpful interest and assistance of Dean James E. Russell, of Teachers College, Columbia University, under whose auspices this and other investigations have been conducted abroad by the writer; the kindly encouragement of Messrs. T. A. Sperry and John Jamieson; the suggestive criticisms of Mr. Felix M. Warburg, and especially of President Henry S. Pritchett, who has co-operated in the final revision, and has kindly written a foreword. I wish also to acknowledge my indebtedness for the courteous aid of the Wuerttemberg Minister for Religious Affairs and Education, Dr. von Weizsaecker; of President von Stumpf and Dr. Losch of the Statistical Office; of Ministerial Director Baelz; and finally of many school principals, teachers, manufacturers and business men, students, artisans, and experts throughout the kingdom, who gave me freely of their valuable time, with that rare courtesy and helpful spirit which I have so often met with abroad.

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WUERTTEMBERG.—AREA, POPULATION, DESCRIPTION, GOVERNMENT

The Kingdom of Wuerttemberg, in South Germany, is the third German state in area (7528 sq. mi.) and the fourth in population (2,300,-330 in 1905). Compared with New Jersey (area 8173⁺ sq. mi., pop. 2,144,143 in 1905) or with Massachusetts (area 8546 sq. mi., pop. 3,003,635 in 1905), it shows a lesser area and a population between the two. Texas is over thirty-five times the size of Wuerttemberg. To be noted on the map is the irregular wedge of land (entering from the south) formed by the little territory of Hohenzollern (440 sq. mi.)—an isolated province of Prussia, and the original cradle of the present Imperial dynasty. From Ulm, at the Bavarian border, the Danube is navigable, and from Heilbronn, in the north, the Neckar carries ships, while traffic on the Lake of Constance is brisk in all seasons. The Black Forest Hills crop out in the west and furnish "Hollaender," the great pines that are floated down to the Dutch shipyards. The Swabian Alps are thrown across the country from southwest to northeast. On the whole, the land is hilly, with mountains and valleys interspersed in bewildering confusion. The climate is equally varied. Thirty-one per cent. of the total area is forest, mostly government owned. Sixty-four per cent. is under cultivation, and furnishes work for forty-five per cent. of the population. Wuerttemberg, since 1806 a kingdom, has been a constitutional monarchy

since 1819. The present King is William II (acc. 1891). The Parliament is composed of two houses ("estates"). The upper chamber, or House of *Standesherren*, has as members: the royal princes (four at present), persons named by the King (there were two in 1906 with hereditary rights, and six who had been named for life), and the representatives of mediatised houses (seventeen in 1906). The King appoints the president of this house. The Chamber of Deputies, or lower house, is composed of thirteen nobles, six evangelical and three catholic dignitaries, the Chancellor of the state university, seven representatives of cities, and sixty-three representatives of districts that might be called "congressional," though better known as administrative units. There are six Ministries—Justice, Foreign Affairs, Interior, Religious Affairs and Education, War, and Finance. For purposes of administration the country is divided into four "Circles": Neckar (chief seat Ludwigsburg), Black Forest (Reutlingen), Danube (Ulm), and Jagst (Ellwangen). These correspond fairly well with the natural divisions of the kingdom. The "Circles" are divided into a total of sixty-four "Districts" (*Oberaemter*), Stuttgart making two of these. The smallest local division is the *Gemeinde*, or commune, corresponding fairly well to our "township." Of these there are 1905. Thirty-seven of them have a population of five thousand or over, that is, are cities, one hundred and thirteen show a population between two and five thousand each, and the rest are below two thousand—some of them the merest villages together with the outlying country. In Wuerttemberg there are very few isolated dwellings, even in the rural districts. In this report, the *Gemeinde* is usually referred to as the "commune," "community," or "locality."

An interesting geographical fact is that Wuerttemberg contains within its area several "enclaves," or bits of territory belonging to neighboring German states, which in turn have enclaves subject to Wuerttemberg rule. The kingdom contains three bits of land belonging to Baden, with a total of 2934 acres and 1152 inhabitants; belonging to Hohenzollern, 6330 acres, in three divisions, with 1042 inhabitants. Baden encloses four Wuerttemberg spots, with 2735 acres and 240 people; Hohenzollern has four Wuerttemberg areas with 6605 acres and 1291 inhabitants. Two other bits of land are under the co-dominion of Prussia and Wuerttemberg, and of Baden and Wuerttemberg, respectively.

THE INDUSTRIAL IMPROVEMENT SCHOOLS OF WUERTTEMBERG

CHAPTER I

THE PLACE OF VOCATIONAL TRAINING IN THE KINGDOM

In the old German song which Longfellow has aptly rendered into English, a Swabian peasant—doubtless from Wuerttemberg—bespeaks happiness for the “stout and hardy men and the nut-brown maidens there.” The measure of contentment claimed for the rugged tillers of the soil is found in all walks of life in that snug little kingdom; for Wuerttemberg is the kingdom of contentment. Other lands may have towns that are bigger and busier than those here seen—the true story of the development of New York or Chicago outclasses the fairy tales of seven-leagued progress—but few countries show either town or land where the conditions not inherent in soil, climate, or location are more generally hopeful than in Wuerttemberg. This notwithstanding certain native disadvantages. The country is comparatively poor in natural resources. Though rich in salt mines, there is a lack of coal for manufacturing purposes and only a scant supply of “white coal,” otherwise water-power. Here are no bonanza farms or wealth-producing El Dorados. In many a case the waste of a Kansas wheat-farm would make a merry harvest for the Wuerttemberg peasant.

Industrial competition is intrenched on all sides without the kingdom. Furthermore, the property-owner may not look to the earnings of the government railroads to reduce his taxes, for a glance at the map of Europe reveals the unfortunate situation of the country with regard to transcontinental traffic, and explains why the annual profits are only three per cent., or about enough to pay the interest on the railroad debt, whereas the Prussian railroads yield an annual revenue of six or seven per cent. The Wuerttemberg system is overbuilt, and is at the mercy of the larger *Reichslaender*. Bismarck at one time

nearly succeeded in consolidating the states' railroads into an Imperial system. But the South dissented from the plan, and now the conditions are reversed. The South, and especially Wuerttemberg, is the victim of traffic discrimination. Neither is there much tourist traffic here, at least to such extent as maintains many an European town through the lavish expenditures of Americans. While speaking of revenues, let us mention the chief proprietary source of income for the kingdom. Here is a wonderful illustration of that statesmanlike prevision that has put the country on an economic basis that is unassailable, and which, in substance, is the theme of my writing. The government forests, in 1904, covered an area of 483,421.5 acres. When all expenses of maintenance had been paid, there was a net revenue from the forests in that year of \$2,701,587.25. And that without impairing their value in any way. Here is a regard for "woods and templed hills" that is not only patriotic, but practical. Such forethought, evinced in many directions, has made Wuerttemberg self-sustaining and independent. If not wealthy, it is prosperous, and that is better. The government assists and protects the agriculturist and the laborer just as it aids and protects the manufacturer—helping to increase both the quantity and the quality of the output of factory and field. And despite the drawbacks already cited, despite the cumbersome traditions of court and caste that prevail, despite the awkward alliance of church and state, and other inherited encumbrances, the various elements of society co-operate to a degree not found in some democracies. Study at close hand shows that problems of common interest, whether relating to social, commercial, agricultural, or industrial needs, have been met in a statesmanlike manner.

Upon investigation the industries of Wuerttemberg are found to be surprisingly diversified and prosperous. As we inspect the numerous towns that cluster in the winding valleys, we are to become convinced that the Wuerttemberg workman is doing his full share for the German industrial advance, an advance that is attracting the attention of the world and is even putting the English competitor on the street. The cleverest Yankee inventions are readily imitated by the German manufacturer. On the other hand, there is a rapidly increasing exportation to America, or to rival markets, of a vast quantity

of Wuerttemberg products, of the kind wherein superior workmanship is, on the whole, the essential quality. The Declared Export Returns of the various consuls at Stuttgart supply abundant evidence of this fact. Stuttgart stands next to Leipzig as a German publishing centre, and its products are exported annually to the extent of millions. But it is not in artistic printing alone that Wuerttemberg excels. It is made clear by the Imperial Statistics, verified by our personal investigations, that Wuerttemberg is more than holding its own among the German states in the production of machinery and implements, in the textile, wood and metal working industries, and in the manufacture of musical instruments and art materials, and of paper, leather, and rubber goods. When it is observed that Wuerttemberg is also producing its share of the agricultural output of the Empire, at the same time furnishing its full quota of 25,000 men to the Imperial army, what the industrial achievement means, in the face of natural disadvantages, becomes clear. It means that the Wuerttemberg workman has taken his place in the front rank of that industrial army that is fairly started on a conquest of the world of trade. No one in possession of the facts will deny that this campaign has been well planned, or that Germany is making rapid progress in this direction. England has already been successfully invaded, and the "practical Yankee" set at naught. Take this illustration as one of many: the single item of machinery and tools. Germany's sales to the United States have doubled in the five years from 1900 to 1905. Meanwhile, American sales to Germany, in this line, are now about one-third of the totals of five years ago. For the same period, Germany now sends to England twice as much finished products, receiving only two-thirds the former imports. To Sweden, Denmark, Argentine, and Chile, Germany now sends double the quantity of machinery and tools exported five years ago, while to China it sends five times the former amount, and to Canada four and to Portugal three times the quantity sold in 1900. In the case of all other countries there has been a gradual increase of trade.

Our consuls, importers, and manufacturers who are in touch with the situation seem to have agreed that this successful German invasion of the world's markets is the logical outcome of the greater average efficiency of her workmen. An analysis

of what Wuerttemberg has done toward securing this high vantage ground gives the keynote of progress for the whole German industrial movement, and is the more fruitful since the kingdom has this very year embodied the results of over three-quarters of a century of experience with industrial improvement¹ schools (*Gewerbliche Fortbildungsschulen*—industrial “continuation schools”) in a remarkable bit of legislation, to be described in detail later. The industrial and commercial improvement schools of Wuerttemberg are designed to give a broad vocational training to boys and girls of fourteen to eighteen years who have left the common schools at the end of the compulsory period (six to fourteen), as nearly all do, and have gone to work.² This training forms a basis for greater efficiency and for industrial and commercial intelligence. Instruction has hitherto been given on Sundays or holidays or in the evening, but under the new law will be given in the daytime on week-days. The schools attract older workingmen, as well as apprentices. One evening, when I was conversing with the director of the Stuttgart industrial improvement school, a man fifty-two years of age entered the office and enrolled for his thirtieth half-year in the institution. I talked with many who had been regular in attendance for ten or a dozen years. When schools attract and hold students in this way, it is evident that they have something vital to offer, and that this belief is shared by the masses. It

¹ Throughout, I have by preference employed the term industrial, commercial, or general “improvement” schools, in lieu of the expression “continuation” schools. The *Fortbildungsschulen* in which general subjects (that is, mainly the “four R’s”—reading, writing, arithmetic, and religion) were taught originated before the vocational (industrial and commercial) *Fortbildungsschulen*. In the case of the former there was a real “continuation” of the work done in the common schools. This is hardly so apparent in the case of the vocational *Fortbildungsschulen*; and many Germans are not satisfied with the term that has been in vogue. In our language “improvement schools”—qualified by the adjective “industrial,” “commercial,” or “general”—seems better, and moreover a notable precedent for its use is found in an important series of English special reports on German schools.

² The German Imperial law prohibits altogether the regular employment of children under twelve in the industries, and permits their employment when above that age only under the severest restrictions as to hours of labor, factory conditions, and compliance with the compulsory education laws. A great many go to work at the age of fourteen.

also becomes clear, with regard to schools in general, why for many years the Wuerttemberg records have shown no perceptible traces of illiteracy in the kingdom.

Wuerttemberg, in area and population comparable to New Jersey, had in 1905 two hundred and forty-three industrial and commercial improvement schools, public drawing schools, and "women's work" schools (*Frauenarbeitschulen*) scattered throughout the kingdom, with a total of twenty-eight thousand five hundred and seventy-four students. One hundred and fifty of the institutions were industrial improvement schools for young men,—twenty-two compulsory, by local option, and one hundred and twenty-eight non-compulsory,—attended by 18,535 students (1349+17,186); four were commercial improvement schools—two compulsory and two optional—with a total enrolment of 1245 (225+1020); forty-two were industrial drawing schools, with 894 pupils on the rosters; fifteen were industrial improvement schools for girls (or female departments in the industrial improvement schools for men) with 1042 in attendance; and thirty-two were "trades schools" for girls and women, with 6858 on the lists. Industrial drawing was taught in these schools by six hundred and fifty-four specialists, and the remaining subjects by nine hundred and fifty-two instructors. The state gave aid to the schools to the extent of \$73,500, of which \$66,500 was for the industrial and commercial improvement schools alone. The growth of the two last named institutions during the past forty-five years is indicated by the following statistics: In 1861-'62, they were found in 84 localities, with 7273 pupils; in 1871-'72, 155 places, 9763 students; in 1881-'82, 153 communes, attendance 10,225; in 1891-'92, 188 and 17,250; in 1901-'02, 239 (of these, 104 were schools for drawing only) and 21,054 students; at present, fully 30,000 students, including those in the "women's work" ("trade") schools.

The new law—to be in full operation in 1909—will add a still greater number to the lists. It compels all localities (*Gemeinden*), having for a period of three successive years at least forty youths under eighteen years of age engaged in industrial or commercial pursuits, to establish an industrial or commercial school, and to maintain it as long as the number of such youths employed does not fall below thirty for three years in succession. The term

"commercial or industrial pursuits" is given the widest possible scope in Wuerttemberg, and takes into account not only the factory hand and the counting-house assistant, but the day laborer, the grocer's clerk, and the errand boy. The law provides for the compulsory attendance of all young workmen (a stipulation formerly left to the localities to decide, in virtue of Imperial laws based on a North German ordinance of 1869). The chief objective point of the law is to furnish opportunity for instruction during the work-days,—instead of evenings, Sundays, or holidays, as before. The minimum number of hours per year is to be two hundred and eighty. The schools are to be organized more strictly than ever along vocational lines, and instructors specially prepared through long courses of training are to be put in charge everywhere. The courses will extend over a term of three years, instead of two, as formerly.¹

Besides the schools already mentioned, Wuerttemberg has an unusual number of other state-aided institutions and special courses, of all grades, in which vocational instruction is given. This in addition to a general educational system that is as well developed as any in the world, if not better. Peculiar to the system is a great variety of types of schools, each concentrated upon a special aim. The vocational schools have been more practical than in other states, and have enrolled a higher percentage of the population. Wuerttemberg was the first to make vocational education compulsory by state law with day instruction for all apprentices engaged in industry or commerce. Wuerttemberg's classical schools have long been more classical and its "realistic" schools stronger in mathematics than those elsewhere in Germany. Its system of schools for all the people is the oldest in the world. There is a considerable number of "Latin" schools in the kingdom—the direct descendants of the monastic and municipal schools of the middle ages, though at present modern in spirit and equipment. Likewise the theological seminaries are the continuation of the old monastic schools, with the addition of modern methods. The University is one of

¹ A detailed analysis of the recent legislation for the industrial improvement schools—a codification of experience in vocational education that is now the model for all Germany—is postponed to Chapter III. The historical growth of vocational school types is outlined in Chapter II (abridged for the present use).

the oldest in existence, and excels in the theological department. The agricultural college is the oldest in Germany. The same is true of the Industrial Museum at Stuttgart. Also, the pedagogical exhibit of this Museum is the oldest permanent exposition of the kind in the world. The Sunday schools of Wuerttemberg are the oldest institution of the kind in existence. Reutlingen, in Wuerttemberg, had the first "women's work" school in Germany. Wuerttemberg has done much more than Prussia for the education of women through state initiative. Its Technical College (or Institute of Technology) and Royal Building Trades School are in many respects admittedly the best in Germany. The educational system is unique, too, in the fact that home training is much preferred to that of the kindergarten for the earliest years. There are very few schools for infants, the kindergarten being ordinarily private, not included in the state system, and only rarely considered part of a city system, although more often subsidized by the latter.

If proof of the general efficiency of Wuerttemberg's educational system is desired, compare, for instance, the almost absolute literacy¹ of the kingdom with the records of our States highest in this respect—those in the West. Iowa and Nebraska headed our honor roll in 1900, with a percentage of illiteracy of "only" 2.3 per cent. Maine, the first Eastern State in the list, came eighteenth, with 5.1 per cent. who did not read or write. New York State is next, with 5.5 per cent.—New York County (Manhattan and the Bronx) 8.1 per cent.—while Louisiana is at the bottom of the list, with an illiteracy of 38.5 per cent. All make a poor showing in the statistics of general culture when put side by side with Wuerttemberg. Or, if you believe the comparison on the basis of literacy unfair, because of our colored population and annual accessions of illiterate immigrants, compare in relation to the population the state-aided schools and attendance in Wuerttemberg with all the schools, public and private, of any state in the Union. Compare also the "clock-work" school-attendance of Wuerttemberg, and the training, length of service, and general efficiency of the teachers, with the

¹ Out of 11,000 recruits for the army examined in Wuerttemberg each year, only three individuals, on the average, are found to be illiterate. These are invariably Germans from other states, or from out-of-the-way colonies.

conditions in any American community and see just how far Old World Wuerttemberg is behind New World America in these particulars. Then observe what Wuerttemberg is doing to build, maintain and develop vocational schools. The inquiry furnishes food for reflection.

Before giving the table of attendance in the various types of schools in Wuerttemberg, an introductory word is perhaps required for the purpose of differentiating the vocational improvement schools previously mentioned from the general improvement schools (*Allgemeine Fortbildungsschulen*—"continuation schools") and the Sunday-schools ("Sunday continuation"). For some years all the Wuerttemberg localities have been under the obligation to establish general improvement schools with instruction in religion and the common branches for male pupils who have finished the compulsory common school course, and also for female pupils where possible. Students of both sexes who are through with the common schools are obligated to attend the general improvement schools for a period of two years, and for a total of eighty hours a year, to be given, ordinarily, at the rate of two hours a week, on work-days (usually evenings). In the majority of the agricultural districts, four hours a week for twenty weeks in the winter—and in a few cases instruction on Sunday—is permitted. Exempt from attendance are those who are enrolled in a higher institution, or in a vocational improvement school. In the event that for local reasons the community is excused from the letter of the law, a Sunday school—like the week-day improvement school with instruction in the common branches as well as in religion—must be substituted. Attendance here is compulsory for three years,—in communes with a single day-school teacher, for only twenty hours a year, and in those with two or more, for forty hours a year. In 1905-'06, there were general improvement schools in 1969 Wuerttemberg localities, with 2273 "rooms" and 37,770 pupils (22,682 males, 15,088 females). Of the 2273 "classes," 692 had the instruction spread over forty weeks, and 1581 during the winter semester only, in double measure. On work-days, 1891 classes were taught; on Sundays, 123; on both, 259. Day classes were 749 in number; evening classes, 1302; partly day and partly evening classes, 222. Sunday schools for boys were found in 182 places, with 186 "classes" and 3119 pupils;

for girls, in 1593 localities, with 1646 divisions and 32,345 pupils. Total number of Sunday school pupils, 35,464.

With all due respect for numbers, it must be admitted that the general improvement school of Wuerttemberg is rather a sorry institution in comparison with the vocational improvement schools. And the same thing is true in those German states which require a longer period of attendance yearly. However, their social value is considerable, and they do help a few ambitious persons, and even catch a few black sheep and give them enough mental baggage to enable them to count as literate. But in Wuerttemberg, with a total of only eighty hours a year (making about thirty-two average school days in the two years), there is very little time in which to accomplish the announced aim, viz.: "to impart the knowledge necessary for practical life." In the industrial improvement school it is different. There you have a total of 840 hours in three years (or practically two school days a week), religion and the purely cultural subjects are eliminated, and instruction in the students' own field is given, as far as possible by practical workers of distinction and with special ability and training. Meanwhile the student has the chance to put the theory he acquires to the test in the daily work.

THE SCHOOL ATTENDANCE IN WUERTEMBERG

Total population 2,300,330 in December, 1905. Area considerably less than that of New Jersey. The figures below are for actual school attendance. In the case of elementary and secondary education the statistics are those of January 1, 1906. The others are mostly for 1906, but in the case of the vocational improvement schools, for 1905.

A. In the Elementary Schools System:

In Kindergartens and Infant Schools (not state institutions, and almost exclusively private):

a. In Stuttgart.....	3,000
b. Elsewhere, estimated.....	3,006
In "People's" (<i>Volks</i> -) Schools (ages 6 to 14)...	319,515
In the Six State Normals for Men.....	593
In the Preparatory Departments of Men's Normals.....	507

In the Two State Normals for Girls.....	102
In the Four Private Normals.....	43
In the General Improvement Schools (1969 localities).....	37,770
In the Sunday Improvement Schools (for the common branches).....	35,464
Total.....	400,000

B. In the Secondary Schools System:

In the <i>Elementarschulen</i> (prep. schools—ages six to eight—for the secondary system).....	3,609
In the 91 “Gymnasial” (classical) and “Real- istic-Gymnasial” (modern Latin) Schools:	
In the Four Protestant Theological Seminaries..	186
In the Fourteen <i>Gymnasien</i> (ages eight to eighteen).....	4,305
In the <i>Pro-Gymnasium</i> (or abbreviated <i>Gym- nasium</i>) at Oehringen.....	123
In the Four <i>Real-Gymnasien</i> (Latin—mathematics —modern), ages nine to eighteen.....	1,932
In the Five <i>Real-Progymnasien</i> (or abbreviated <i>Real-Gymnasien</i>)	783
In the Fifty-eight “Latin Schools” (ages nine to fourteen), One Real-Latin School, and Four Latin Divisions in Real-Schools.....	2,233
In the Ninety-two “Realistic” Schools:	
In the Ten <i>Oberrealschulen</i> (giving a nine-years modern-scientific course).....	5,457
In the Six <i>Realschulen</i> with two higher classes..	1,619
In the Twelve <i>Realschulen</i> with one higher class..	2,285
In the Sixty-three <i>Realschulen</i> without added classes (giving a five-years course).....	2,973
In the <i>Buergerschule</i> (“municipal school” of higher rank than the common schools) at Stuttgart.....	1,402
In the “realistic” class of the <i>Realgymnasium</i> at Gmuend.....	125
In the Higher Girls’ Schools:	
a. Thirteen “Public”.....	4,043

b. Six "Private"	929
In the Girls' Higher Normal	73
Total	32,077

C. In the Vocational (Industrial and Commercial)
Improvement Schools:

In Industrial Improvement Schools	18,535
In Commercial Improvement Schools	1,245
In Industrial Drawing Schools	894
In Industrial Improvement Schools and Divisions for Girls and Women	1,042
In "Women's Work" Schools	6,858
Total	28,574

D. In the State University at Tuebingen (Winter,
1,407; Summer, 1,714)

*2,187

E. In the Higher Art Schools:

In the Conservatory of Music at Stuttgart	490
In the Academy for the Plastic Arts in Stuttgart (W., 101; S., 97)	*127
In the Industrial Art School in Stuttgart (W., 129; S., 97)	*155
In the Industrial Art Workshop at Stuttgart (W., 43; S., 50)	*57
Total	829

F. In the Agricultural Schools:

In the Agricultural Institute in Hohenheim (W., 128; S., 108)	*152
In the Veterinary College in Stuttgart (W., 107; S., 97)	*140
In the Agricultural Winter Schools of Ellwangen, Kirchberg, and Ochsenhausen	36
In the Vintner's School at Weinsberg (19 regular, 87 special)	106
In Eight Agricultural Winter Schools	292
In the Gardening School of Hohenheim	12

* Estimated from detailed attendance at the Technical College for two semesters.

In Special Fruit-raising Courses.....	84
In Pomological Courses.....	30
In the Four Housekeeping Schools.....	65
In Three Courses in Agriculture.....	29
Total.....	946

In addition to the foregoing, there are three Agricultural Improvement Schools, and Five Practice Shops for Farriers.

G. In the Technical College (<i>Hochschule</i>) at Stuttgart..	1,381
H. In the Building Trades School at Stuttgart (S. 566; W., 884)	*996
I. In the Technicum for the Textile industries, at Reutlingen	149
J. In the Technical School for Skilled Mechanics and Watchmaking, at Schwenningen	69
K. In the Weaving Schools of Heidenheim, Sindelfingen, and Laichingen.....	94
In the Weaving Workshop at Sontheim.....	92
In the Embroidery School at Wolfschlugen....	25
In the Lacemaking School of Koengen	30
L. In the Tanners' School of Metzingen.....	8
M. In the Technical School for Book Printing at Stuttgart.....	108
N. In the Commercial College at Stuttgart.....	125
O. "Practical-Technical" Courses for master-workmen in a variety of industries—given under the au- spices of the Central Bureau for Industry and Commerce..	276
In "Theoretical-Technical" Courses, under the same auspices.....	35
Total in Special Industrial and Commercial Schools and Courses.....	3,388

Besides the above there are a few private industrial schools—about a half-dozen good ones—in connection with large manufacturing enterprises for the most part. A few courses for apprentices are also given independently under the auspices of unions and guilds.

P. In Orphan Homes, Reformatories and Schools for Defectives:	
In Orphan Homes.....	984
In State Institutions for the Deaf and Dumb...	227
In Private Institutions for the Deaf and Dumb..	440
In Schools for the Blind.....	196
Other Defectives (in Public Schools: 1,086, Private Schools: 11).	1,097
In Reformatories and Rescue Homes for Children	2,333
	<hr/>
Total.....	5,277

RECAPITULATION

In the Elementary Schools System.....	400,000
In the Secondary Schools System.....	32,077
In the State University.....	2,187
In the Higher Art Schools.....	829
In the Agricultural Schools.....	946
In the Institutions for Orphans, Defectives, and Way- ward Children.....	5,277
In the Industrial and Commercial Improvement Schools	28,574
In the Other Vocational Schools and Courses.....	3,388
	<hr/>
Total.....	473,278

The few remaining figures for private schools not mentioned above would not make any appreciable difference in the result. Figures preceded by an asterisk (*) are estimated in accordance with the detailed attendance at the Technical College for two semesters—a very rough approximation is the result, but the numbers concerned are small. It is because the attendance at the higher institutions of Wuerttemberg is tabulated officially by half-years that it is difficult to get at the exact number of individuals enrolled during the year, as would be reported in the year-book of an American university. A careful comparison of the semester lists of the Technical College, for instance, shows that 614 regular and 14 extension students are included in the statement for both semesters under consideration. The total enrolment for the year, then, reduces to 1031 regulars and 350 extension students. Further analysis shows the drawing

power of the institution abroad—a condition characteristic of all the higher institutions of Wuerttemberg. During the winter semester cited, 209 students came from other German states, 106 from Prussia alone, and 66 from foreign countries: during the summer half-year, 190 came from other German states, 109 from Prussia, and 62 from abroad. Two of the regular students for the year were women, and the extension courses enrolled 196 women in the winter and 34 in the summer. These figures are for the Technical College alone.

The table given above does not indicate the entire range of commercial or industrial instruction. Commercial subjects, for instance, may be pursued in the University and in certain of the higher schools ("realistic"). Nearly all the girls enrolled in the common ("people's") and higher girls' schools are instructed in manual subjects. In the common schools this department is called an "Industry School," and a few boys are also admitted to it. Other industrial aids are the lectures and personal assistance of the official travelling instructor (*Wanderlehrer*) of the Central Bureau, and the intelligent help furnished through the industrial museums headed by the National Industrial Museum at Stuttgart, and by means of industrial expositions, both state and local. One hundred and eighty-five apprenticeship workshops are subsidized. Special laboratory aid is placed at the disposal of the merchants and manufacturers of the land. Free advice is furnished by the experts of the Central Bureau, in close relations with the unions of employers and employed. Finally, a valuable industrial journal (weekly, furnished to unions at the club rate of only \$.24 a year) has been issued by the Central Bureau since January 1, 1849; financial assistance is extended to worthy industries; and stipends are granted to young and old for industrial investigations.

A glance at the statistical summary of school attendance in Wuerttemberg discloses the fact that over twenty per cent. of the total population goes to school each year—a remarkable showing when you remember that tradition in Germany has only lately permitted of the secondary and higher education of women, and that to a very restricted degree. Nearly all the school population had direct vocational instruction for a part of the time at least, and about ten per cent. of all the students were in purely vocational schools. The facts give rise to certain

questions. Subsequent chapters will show the historical necessity for these schools, and their development. Also the part played by the state, community, and by private individuals in their organization and maintenance; the attitude of individuals and of employers and labor unions; the important problem of securing efficient vocational teachers as met by Wuerttemberg; how it is that the kingdom has come to take an advanced position in favor of compulsory attendance, and in favor of day instruction as opposed to evening schools; how in common with other European nations it has been driven to establish an agency essentially separate from the ordinary educational administrations, for the direction of the industrial schools.¹ For history clearly impeaches the ordinary educational administrations for the failure to furnish adequate instruction in the industries. It is European experience that they even fail in many cases to do all that lies within their power in this regard until forced to adopt a practical attitude by the fact that the major responsibility for providing such instruction has been placed upon another ministry (industrial or commercial) or body closely in touch with the industries and the commercial needs of the country. As evidence of the non-practical tendencies of the schools in our own land also, witness the general failure, from the point of view of industries, of instruction in drawing or manual training,—subjects introduced originally out of highly practical considerations.² Immediately, however, they came under the sway of a body of cultural theory that is very good in its way, but has been allowed to defeat the original purpose of the vocational training. Unfortunately, too, the field of vocational instruction in the United States has been largely under the control of a heterogenous variety of organizations and of correspondence schools—the ordinary schools having shifted the responsibility.

¹ Under separate ministries in the majority of the larger States of Europe, the lower industrial schools are nominally under the educational ministries in Wuerttemberg and Austria, but are quite as much under the control of the industrial departments (Interior Ministry) through their influence in appointing members of the central vocational school boards.

² Cf. the Report of the Massachusetts Commission on Industrial and Technical Education.

CHAPTER II

THE RISE OF VOCATIONAL SCHOOLS

The tendency toward state aid in financing industrial schools—not only the higher technical institutions, but those of elementary grade, for the common workman—has received its greatest impetus during the last half of the nineteenth century, and especially during the past thirty years. So far as the European states are concerned, this tendency amounts to an established custom that finds greater favor with the increasing years. In France, Austria, Hungary, Belgium, England, the German states, Switzerland, and Italy, such action is looked upon as a national duty. Even in the United States, precedents of the kind are found, both in the national grants of lands and of money for the agricultural and mechanical colleges, and in state appropriations to these and to special technical schools. Not only has the national grant been used for the maintenance of such a higher school as the Massachusetts Institute of Technology, but in other states for such industrial purposes as are subserved by the Kansas Agricultural College, and by the preparatory departments of several mechanical colleges in which elementary trades instruction is given, and where the total enrolment often exceeds that of the mechanical college proper. The recent introduction in state legislatures of bills providing for further financial aid to industrial education on the part of the states, emphasizes the growth of a well-established world principle. For those statesmen who have long held that it is the duty of the body politic to see to it that the component units of the state—individuals—are fortified for their part in society by having at least the elements of a general education, are coming to maintain that it is the duty of the state to assist in equipping all for their practical share in the common life. This growing attitude is a natural result of the increasing complexity of modern economic conditions. During the middle ages, when the guilds regulated the handicraft trades, state initiative in behalf of industrial education did not seem necessary. Instruction in a trade was given by the master in whose house the apprentice resided. It extended over a long term of years, and was broad and thorough, covering all the features of the trade. The apprentice was frequently obliged to assist the

master workman in his book-keeping and other business, hence instruction of a general nature was also provided. Further industrial insight was obtained when the apprentice could take his place as a full-fledged member of the fraternity, an honor much coveted and hard to win. In many a thriving "city-state" of the early modern era the guilds seemed indispensable to the community. However, their political strength proved to be their weakness. Ambitious princes fostered independent industries to the undoing of the guilds. The elementary, trivial and Latin schools, introduced and encouraged by the church, assumed the work of giving instruction, although it was very limited in amount and did not concern itself with vocational teaching. In the face of the competition offered by the stimulated industries under princely patronage the guild masters were often obliged not only to neglect the general information of their apprentices, but to limit the vocational instruction to the meagre necessities of the moment. With the introduction of piece-work, apprenticeship failed any longer to furnish an all-around vocational training. Neither were there any other agencies for the purpose.

At the outset, the organization of special schools to supply this demand for a broader vocational training came about slowly, largely through private initiative, and with instruction mainly on Sunday. At first, the Sunday schools did nothing more than to continue the teaching of the elementary schools, or to supply what they had failed to give. The Sunday school in Wuerttemberg, the oldest institution of its kind which has had a continuous existence, was outlined in the church ordinance of 1559. The scope and functions of Sunday schools were more explicitly set forth by the church authorities in 1695, and in 1739, these schools were made universally compulsory by a synodal order which stated that "all young people must attend the Sunday and holiday schools until the time of their marriage, so that they will neither so easily forget what they have learned in school, nor spend the leisure of Sundays and holidays in a sinful manner." In the Sunday schools they were required to "sing a sacred song, read the Bible, repeat the Proverbs and Psalms, recite from the catechism, produce their compositions, read a letter, and then close with a prayer and the benediction." Arithmetic, too, was soon introduced into the curriculum.

But important as the Sunday school has been in the development of industrial training in Wuerttemberg, it was nearly a hundred years later, when the schools were more directly under the authority of the state, that Sunday schools were made use of for such instruction in that kingdom. The general school regulations promulgated in 1763 by Frederick the Great of Prussia gave directions for the building of Sunday and "repetition" schools so that "the masters might send to school for four hours a week those apprentices who did not have the necessary knowledge of reading, writing, and religion," but went no farther in providing vocational instruction than did the earlier Sunday schools of Wuerttemberg.

While the great educational leaders of the eighteenth century strove chiefly for the advancement of general culture, and while the parochial instruction was confined to narrow limits, a few beginnings of vocational training were undertaken, both on the part of the states and of individuals or associations. Austria, in the early sixties of that century established a precedent by sending abroad for skilled technicians who were despatched into the provinces to visit and instruct the workers, thereby inaugurating the "travelling instructorships" (with which the duties of an inspector are often combined) that have played an important part in industrial training in several European states. Under government protection a "manufacturer's drawing school" was founded in Vienna (1758), a lace-making school at Prague (1767), and the first secular drawing school in Hungary (1770), the Royal Drawing School of Buda-Pesth. At about this time Austria decreed that "all the royal cities and market towns shall maintain spinning schools throughout the winter, and the children of tradespeople shall be obliged to visit them from the seventh to the fifteenth year of their age."

In Germany, it was through private initiative that the first industrial school was established in the north—in Hamburg (1767),—at first for architectural drawing alone. Its promoters were the members of the local "Society for the Promotion of the Industrial and Useful Arts." The school gradually extended its course, and grew in enrolment from 12 individuals in the year of its founding, to 3256 in 1892. Through the initial influence of this institution, the Hamburg type of school and of industrial art became the model for North

Germany, just as that of Munich in Bavaria, Stuttgart in Wuerttemberg, and Karlsruhe in Baden became the types for South Germany, whereas Middle Germany took advantage of both influences, and in some respects worked out its own individuality, as in Saxony, for example. The Hamburg school was unique in the fact that it commenced with evening instruction, instead of the Sunday courses alone which characterized the majority of the elementary industrial schools. In Bohemia, it was the common school with manual instruction brought in to an unusual extent—the “Industry School”—that promised to be of the greatest general assistance in the development of vocational teaching. Introduced by Pastor Kinderman, there were soon one hundred of these schools in (1787) and 232 by 1790.

In France, where drawing and other elementary industrial schools had long been in existence through private initiative, the state committed itself to the policy of actively aiding industrial education at this period, but began at the top, or with the higher technical schools, just as it commenced with the universities in establishing a general system of education after the Revolution. At Berlin, the Union for the Erection of Sunday Improvement Schools for Apprentices founded the first improvement school of that city, in 1797. Two years before this, a spinning institute at Birkach near Hohenheim in Wuerttemberg, established by the local pastor, marked the initial point for the “industry schools” (*Industrieschulen*) that have since become consolidated with the common schools of that kingdom. Munich, in Bavaria, had a drawing school under royal protection in 1792, and in 1793 an industrial school with holiday instruction. An industrial school for girls was organized at Nuremberg in 1792. Instruction in sewing, knitting, spinning, and housework was given. Similar schools were soon established in a number of Bavarian localities, and in 1804 these “work-schools” were combined with the common schools by general regulation, after the manner of the present “industry schools”¹ of Wuerttemberg.

Isolated cases of this type of instruction are found earlier—in many communes of France in the sixteenth century,

¹ The so-called “industry schools” of recent times in Bavaria (which have lately been abolished) were different. The four schools of this type at Munich, Nuremberg, Augsburg, and Kaiserslautern dated from 1868.

while in Germany an institution of the kind was carried on at Hamburg in 1604 in connection with an orphan asylum. In Baden, which had an industry school in a "poor and orphan home" in 1718, this was followed by other industry, or "economy" schools, established at different intervals of time. In 1803, a Baden edict declared that girls should be taught spinning, sewing, and knitting, in industry schools, and that attendance on such schools should be compulsory unless suitable instruction of the kind were provided at their homes. A yearly test was to determine what progress had been made. But in consequence of the political and industrial uncertainty of the times, neither did the industry schools of Baden and Bavaria meet with continued success, nor did the plans of those countries for industrial and technical schools of higher grade come into prompt fulfilment. The spinning schools of Austria received a setback for the same reasons. With the re-established stability of governments after the Napoleonic era, the states turned their attention first to general education, and vocational instruction, except that of the higher grade, was left to private initiative for the most part, until the middle of the nineteenth century. Baden and Wuerttemberg were to be the chief exceptions to this general rule. In the case of the polytechnic schools, or higher industrial institutions, the chief dates for the state foundations are as follows: Paris, the first, 1795; Prague, 1806; Vienna, 1815; Berlin, 1821; Karlsruhe, 1825; Munich, 1827; Dresden, 1828; Stuttgart, 1829; Hanover, 1831. Several of these—Stuttgart and Hanover, for instance—started as trades schools, but were later raised to the standard of fully equipped polytechnics.

The first movement toward the general introduction of Sunday industrial instruction in Wuerttemberg was the preliminary inquiry set on foot in 1818 by the Educational Ministry. The Society for the Promotion of the Useful Arts at Frankfort. a-M. had already founded an industrial Sunday school. The problem for Wuerttemberg was to introduce such instruction into the regular Sunday schools. In 1825, the Royal School Board, in charge of the higher classical and "realistic" schools, and although originally intended to prepare graduates directly for industrial occupations, they became chiefly preparatory schools for the higher technical institutions.

was entrusted with the duty of propagating Sunday industrial schools (in lieu of some of the regular Sunday schools), and of determining their programs and administration. The courses of study of the following year placed emphasis on the teaching of drawing—free hand, geometrical, and architectural; industrial arithmetic, industrial geography, practical geometry, and mechanics, elementary technology, bookkeeping and estimating. The number of the schools increased rapidly because of the recognized need which they attempted to fill. There were thirty Sunday industrial improvement schools in Wuerttemberg in 1827, and thirty-seven the following year. But the schools could not give entire satisfaction because of the difficulty in obtaining fully prepared instructors, and because the same books and other materials that had been employed for the common and *Real-* schools were used for the specialized instruction. Improved from year to year, the schools were established in sixty-nine Wuerttemberg towns by 1846, and enrolled a total of 4500 pupils. The meagre character of the instruction given may be measured by the fact that forty-six of the schools only occupied two hours a week each, while in thirty-eight there was only a single teacher. Despite all efforts of the Royal School Board, little ground was gained until after the organization of the Central Bureau for Industry and Commerce—under the Interior Ministry—in 1848, and its subsequent activity in the development of industrial schools.

Before continuing to outline the growth of industrial improvement and special trades schools in Wuerttemberg, four or five movements that were especially active during the first half of the nineteenth century should be mentioned. One of these is concerned with the growth in Germany and Austria of the *Real-* schools with their emphasis on science, mathematics, and modern languages in lieu of the classics of the *Gymnasien*. For the middle classes they furnished the nearest approach to the vocational-school type, and were destined to be the chief recruiting ground in later years for the higher technical schools of university rank. Their share in the preparation of commercial leaders has always been considerable.

A second important movement was the gradual freeing of industry from the destructive effects of a system of innumerable taxes and customs duties. At the commencement of the nine-

teenth century there were in the ancient province of Prussia alone "sixty-seven different tariffs for almost three thousand kinds of merchandise, and these were to be reckoned in any one of seventy-one officially established coinages." Not only were the German states separated from each other by tariff walls, but the towns within each land had each its own city-customs duties,—as Paris now in the case of provisions. Significant of the conditions of the times was the proud proverb of South Wuerttemberg—(*Ulmer Geld geht durch alle Welt*,) "The money of Ulm will pass anywhere"—a fact not true of a great many German towns whose exact financial status could not be ascertained. At the beginning of the nineteenth century the guilds also possessed many exclusive privileges which tended toward the restriction of trade. Prussia was the first to break away from the toils which retarded industrial enterprise, and its customs law of 1819 brought free and unrestricted trade to the interior localities. The clever political influence of Prussia succeeded in extending the benefits of such legislation to other German states, and led to the Universal Customs Union of 1834, a union that later included not only all the German states, with the exception of a few of their communes, but also the Grand-Duchy of Luxembourg and several communes in Austria. The advantages that accrued from the removal of inter-city and inter-state restrictions caused commerce to go forward by leaps and bounds, with the resultant benefit to industry.

Closely interrelated with the movements already cited was the complete abolition of the guilds, as in France (1791), or their restriction, as in Austria by imperial decrees, and in Prussia through the celebrated edict of 1810; the organization at a later date of industrial unions, and the share these associations took in the founding of special trades and industrial schools, and in inspiring state initiative in this direction. A further stimulus to the industrial institutions of Germany came from the influence of France, exercised not only directly, but also through its effect on English, Belgian, and Austrian industry. It was in France that the early introduction of geometry—a subject that was to have a far-reaching influence in industrial education—met with especial favor. It was here also that in both the seventeenth and eighteenth centuries not

only were the common schools developed to a degree not found in other countries, but vocational instruction had been introduced in many communes through private initiative. Here, again, the development of art as applied to industry early reached a high state of perfection. France was the first to found a polytechnic school, and, although the central government paid little attention to the establishing of elementary industrial schools until the last quarter of the nineteenth century, it had special facilities for the training of technical teachers before the end of the eighteenth century. Industrial taste and industrial intelligence were widely disseminated by the experts sent into the provinces.

Paris was in the eighteenth century, as it is now, the heart of a centralized nation whose industrial life current was constantly revived by communication and contact with the capital. However, it was not until the London Exposition of 1851 that the eyes of the industrial world, and especially of the English, were fully awakened to the superior excellence of the French products of industrial art and to the causes of their supremacy in the markets of the world. England became alive to the lack of facilities for industrial education. The newly organized Science and Art Department took up the problem, and within a few years a vast system of industrial drawing schools was organized, with the Industrial Art School of South Kensington Museum as the center and chief source of instructors. By 1873, England and Scotland had 173 industrial schools of art, with 22,000 pupils, and 460 evening art classes. Also, in over 2000 elementary schools drawing was a compulsory subject. There were besides, in England, Ireland, and Scotland, nearly 1400 industrial schools and several hundred chemical laboratories, with a total of nearly 50,000 students who were preparing themselves for the building, mechanical, or chemical industries. Under the protection of the Prince Consort, elementary industrial education was organized with more system than any other type of instruction in England. The consequent benefit to English trade is a matter of history. Yet in recent years Germany has done much more than England in the direction of elementary industrial instruction. The result is already shown in the relative commercial position of the two nations.

Somewhat earlier than England, Wuerttemberg was the



other European state to attack seriously the problem of industrial training. It was spurred to action not only by local needs but by the example of France and Belgium. In 1848, the agitation in favor of industrial betterment led to the formation in Wuerttemberg of the Central Bureau for Industry and Commerce, under the Interior Ministry, which had charge of the handicrafts schools, while the Sunday industrial institutions still remained under the charge of the Royal Board. What followed has been duplicated in other European countries. Business interests pressed for a more practical administration of the improvement schools. The final result was a permanent Royal Commission (appointed in 1853 to represent both the Educational and Interior Ministries), under the presidency of the head of the Central Bureau. This commission, under a recent law, is superseded by a Higher Industrial School Council similarly organized.

Since the Sunday industrial schools did not allow sufficient time for thorough industrial training, the Royal Commission soon took the first step in advance by providing also evening industrial schools for the more capable candidates. Two courses were given. The apprenticeship course was to comprise the introduction to industrial composition and correspondence, industrial arithmetic, and whatever geometrical principles are of greatest importance in industry, and finally drawing, both mechanical and decorative; in the higher course, the mathematical subjects and drawing (with the addition of modelling) were to be continued, and, as new material, physics and mechanics, industrial chemistry, and lastly bookkeeping, and the principles of industrial economy, were to be taught. Attendance upon industrial schools was to be optional, although those who came under the provisions of the Sunday school compulsory law were still obliged to attend the Sunday general improvement school or the Sunday industrial improvement school in the event that they did not elect to follow the courses of the evening industrial establishments. These provisions continued in force until the Imperial Industrial Ordinance came into effect with the entrance of Wuerttemberg into the confederation of German states in 1871. Then a small but ever increasing percentage of the local cities took advantage of the privilege therein con-

ferred upon them of making attendance upon industrial improvement schools compulsory.

The industrial improvement schools were made local (*Gemeinde*) institutions from the outset. Their immediate inspection and direction was left to the communal school board, which was required to constitute a special commission for industrial improvement instruction through the appointment to the committee of capable industrialists, and of the principal of the school. The state agreed to furnish one half of the expense remaining after the locality had provided the building and equipment and the amount of tuition collected had been applied on the remaining liabilities. The industrial guilds and unions helped, by advancing the tuition of poor pupils wherever it seemed advisable. The president of the Central Bureau and the members of the Royal Commission proceeded to visit the communal councils and to urge in every way within their power the establishment of the schools. The great difficulty, as everywhere, at the first, was to secure instructors who could give the vocational work. For the very important subject of industrial drawing, some had already been trained in the special school founded by the commission. In 1854 there were twenty-five industrial improvement schools, and by 1856 forty-five, with both Sunday and evening instruction. By 1861-62 the schools had been established in 84 localities, with 7273 pupils; and in 1871-72 in 155 places, with 9763 in attendance. Several important results of the first experiment were soon evident. First, the increased efficiency of those workers who attended the fully equipped schools was so marked as to win for all time the influence of industrial employers and unions in favor of the improvement schools. Second, it was found impracticable and unnecessary to separate the school programs into apprenticeship and journeymen courses, except in the large cities. Third, it was found that the payment of tuition, however small, in the case of adolescents and adults, increases the self-respect and self-dependence of the pupils and adds to the value put upon the instruction. Fourth, the compulsory-attendance requirement is not satisfactory if the locality is not prepared to equip the school with a capable teaching personnel and with the material necessary to give the best results. Soon after the organization movement was fairly started, several communes hastened to

enact a compulsory law on the principle that what is good for some is good for all. Since they were unable to obtain instructors sufficiently qualified for the new work, or to provide suitable quarters and the other desiderata, the outcome of this zeal was disastrous and in some cases discredited the schools for a time.

Wuerttemberg now leads all German states in the extent of the development of its industrial improvement schools. Other states are not far behind in this respect, the growth in the past five years being especially marked. Bavaria followed Wuerttemberg, in 1864, with a general ordinance for the organization of industrial improvement schools. Saxony did likewise in 1873, although in that kingdom the system of special technical schools for a variety of industries is the most noteworthy feature of a well-planned scheme of industrial training. Baden, which in 1834 commenced to pay much attention to the organization of higher industrial schools, and Saxe-Coburg-Gotha passed state laws in behalf of industrial improvement schools in 1874. Saxe-Meiningen-Hildburghausen did similarly in 1875. It was well along in the eighties before the movement became general. Saxony, Baden, Wuerttemberg, and Hesse early passed compulsory laws for attendance at general improvement schools. In Prussia, the increasing strength of the Polish constituency of West Prussia and Posen led to the law of 1886, in which the Minister of Commerce and Industry was empowered to make attendance at the improvement schools (semi-industrial) compulsory for all workers under eighteen. In 115 localities such institutions were established, but the law failed through lack of a penalty or because the industrial program could not thrive in agricultural districts, without modification. When in 1891 the Prussian state assumed a large part of the financial responsibility for improvement schools, they were soon introduced in all quarters of the kingdom. However, a great many of the so-called industrial schools of Prussia, and the industrial improvement schools of Bavaria up to the year 1900, were merely general improvement institutions with industrial drawing added to the regular schedules. The whole tone, purpose, and content of the northern industrial improvement schools, especially in Prussia and Saxony, has been strengthened through the efforts of the German Union for Improvement Schools, organized in 1892.



Not alone in regard to the improvement schools, but in many other directions, the Educational Ministry and the Royal Commission of Wuerttemberg busied themselves for the attainment of industrial efficiency. Toward and after the middle of the nineteenth century these activities were most pronounced. The schools were to reach everybody dependent on industrial or commercial pursuits—the child in the “industry schools,” the apprentice or journeyman in the improvement schools or in the special drawing schools or courses, the prospective foreman or superintendent in special technical schools (mechanical, textile, or building trades), the engineer in the technical university. Training for girls and women was provided in the “industry schools,” in “women’s work” schools, and in the special and improvement schools.

In order to furnish facilities for the education of foremen, the Stuttgart Trades School had been founded (in 1829). By 1840 the school had attained such scope and grade of work that it was called the Polytechnic. In 1845 the courses in secondary technical instruction were classified separately and the present Royal Building Trades School was founded. In 1862 the Polytechnic was made a *Technische Hochschule*, or Technical College of university rank.

Of the special technical schools (*Fachschulen*) Reutlingen had the first one—the now famous *Technicum*, or Technical Institute for the Textile Industries—founded in 1855 by the Weaving-school Union and later subsidized by the state. In Reutlingen, also, the movement in favor of “women’s work” schools began, in the sixties. The technical weaving schools at Heidenheim (1860), Sindelfingen (1869), and Laichingen (1873) were monuments of the earlier years of the industrial movement. The other special technical schools are of comparatively recent founding, and in their plan give expression to the results of long experience. The older schools have been many times remodelled in keeping with current requirements.

It is about thirty years since the “industry schools”—those in which sewing, spinning, knitting, and similar work is taught—were united with the common or “people’s” schools. The latest separate statistics for the “industry schools” date from 1895-96, when in 1929 schools a total of 120,377 pupils received such instruction. Only 283 of these were boys, the number of

male pupils allowed to take the work—compulsory for girls—having diminished steadily from the outset. The total attendance in the “people’s” schools during the same year was approximately 142,000 boys and 156,000 girls.

CHAPTER III

THE REORGANIZATION OF THE INDUSTRIAL IMPROVEMENT SCHOOLS

The new industrial improvement school law of Wuerttemberg deserves an extended analysis here. It embodies not only the experience of the kingdom in which the elementary industrial school has been most thoroughly developed, Wuerttemberg itself, but that of the other German states as well, since a commission which was sent out to study the conditions in the neighboring states gave the Central Bureau and the Educational Ministry the benefit of personal investigations. Moreover, representatives of the industrial boards of trade and of the unions participated in the preliminary studies. Finally every detail was examined thoroughly in the offices of the Central Bureau and of the Ministry, as well as in the ultimate committee of the Parliament and on the floors of the houses themselves. The law naturally represents an advanced position with regard to industrial training, a position so advanced that even in America, where everything is possible, we may not hope to put several of its fundamental principles into general practice here for many years. I refer especially to the requirements for compulsory attendance and day instruction. And it is interesting to note that these stipulations, together with the determination of a satisfactory minimum of hours of instruction, were considered the most important in the Wuerttemberg bill. The requirement for day instruction, as opposed to evening, was counted the most important of all. The other main issues of the Bill as heartily indorsed by Parliament were the reorganization of the industrial improvement schools as strictly vocational institutions, and the preparation of teachers especially trained for the work of these schools. It was because of the lack of teachers sufficiently equipped to carry out the new plans—a lack that the state is meanwhile attempting to fill by granting scholarships for instruction to a

chosen corps—that the most vital requirements of the act do not go into effect until April 1, 1909, and even then the compulsory law is to become effective only a year at a time, beginning with the youngest who fall within the stipulated ages. Those parts of the act which are operative after January 1, 1907, relate to the appointment of teachers and to the organization of the governing boards.

The chief provisions of the law, to be discussed more fully farther on, are as follows: Every locality, or commune, in which for three successive years an average of at least forty male workmen under eighteen years of age are engaged in commercial or industrial pursuits, is obliged to provide an industrial improvement school—to be called an “industrial school” or a “commercial school” under the new law—for their reception and instruction, and to maintain the same as long as the number of workmen of the stated age does not fall below an average of thirty for three successive years. The ordinary school under the law will be an “industrial school,” but if the needs of the community are such as to require a “commercial school” also, it is to be erected in addition. Decision concerning the extra school lies with the local school board, the community council, and finally the Higher Industrial School Council. In the case of very poor communes, the building of the industrial school may be postponed for as long as ten years by action of the Ministry, but they must support a general improvement school at all events.

Every young man in a commune, who is engaged in an industrial or commercial pursuit, and is of the required age, under eighteen—they are usually through the common schools at fourteen—is obliged to attend the school for three years. If the eighteenth year is finished in the course of a school term the obligation extends until the end of the semester. Communes which provide for a four-years’ course of study may make the attendance compulsory for the fourth year also, in the case of all or of certain industries. Those workers whose employment ceases at given periods of the year, or is interrupted for other reasons, may be authorized to attend school in the locality where formerly employed, or if this is not their home commune they may attend at the latter place. Those may be freed from the compulsory attendance requirement who attend a guild school or other

industrial institution whose instruction is considered by the Higher Industrial School Council to be the equivalent of that outlined by law. Likewise, those who show exceptional training may be excused. Workers in certain branches of unskilled industries, such as the bakers, the barbers, market men, may be excused from the instruction in drawing, or by vote of the common council, with the approval of the Ministry, may be turned over to the general improvement schools. Those not of the compulsory age may be allowed the privileges of the schools, as has heretofore been the case. The local school board passes on such matters, and the persons admitted are under the usual school regulations.

The common councils may authorize the erection of industrial schools for girls, or the creation of departments for girls in the regular industrial schools. In accordance with the imperial law of 1900, the communes are allowed to make these schools compulsory for employed girls under eighteen years of age. The authorization of the common councils for the erection of special industrial schools for girls, or for the creation of a special industrial department for girls, must be approved by the Higher Industrial School Council—the new name for the body formerly known as the Royal Commission for Industrial Schools. Through similar procedure, those communes which do not come under the requirements of the law because they do not have forty workers of the stipulated age may nevertheless be authorized to build industrial schools. Communes may unite to establish an industrial school if the total number of workers within the compulsory law is at least sixty, on the average, for three consecutive years.

With the approval of the Higher Industrial School Council the communes may be authorized to collect tuition from the pupils. The stipulation may be made that the employers must advance the amount of the tuition. The state pays half of the amount required for maintenance after the tuition and gifts are applied toward it. The minimum number of hours of instruction, that is the hours each obligated student must attend, for each of the three years, is 280, to be further reduced only by action of the Higher Industrial School Council. The instruction is to be given throughout the year if possible, although in the case of industries which have a

regular shutdown season, the instruction may be lumped at this time, with due regard to the minimum requirement. The compulsory instruction is to be given in the daytime, not later than 7 P.M., although the Higher Industrial School Council may in individual cases permit it to be given as late as 8 P.M., for a period of three years, and for a period of seven years may allow the instruction in drawing to be given on Sunday forenoon during the two hours preceding or following the chief divine services.

The general course of study to be followed will be issued at a future date, since two years must elapse before it is strictly needed. Employers are obligated to inform the industrial school principal as to each and every worker of the compulsory age who enters or leaves their employment, within four days after such time. They are further required to release these workers for attendance at school at the necessary periods, as well as to see to it that such attendance is punctual and regular. Fulfilment of the latter requirement is also made the duty of parents and guardians. The penalty to be inflicted upon employer, parent, or guardian responsible for violations of the attendance law is to be up to \$4.00 for each offence, or imprisonment for as much as three days. The pupils responsible for such derelictions are punished under the regulations applicable to the general improvement schools, that is, a fine of at least \$.24 or "school arrest"—imprisonment in the school jail. As in the case of the general improvement schools, students of the industrial schools who are under seventeen years of age are forbidden to enter drinking places unless accompanied by an older responsible person, or else when on a journey, or at the parent's place of business. Penalties for the transgression of this law are the same as for non-attendance at school.

The instruction in the industrial school is preferably given by teachers employed for the school exclusively, but also by those who teach in other schools or who engage in some other occupation as a chief employment. Those employed to teach principally in the industrial schools must be appointed by the state. In case the state appoints for life, the commune is allowed to propose names. Appointment to part time positions is made by the commune, with the approval of the Higher Industrial School Council. Those men employed as full time teachers have all the rights of state employees as to

pension and other emoluments. Women employed for life have the same privileges as those instructing in the higher schools for girls, except that they must be unmarried at the time of appointment and are under the authority of the industrial school principal, of the industrial school board and of the higher authority.

Each industrial or commercial school is under the direct local supervision respectively of an "industrial school board" or a "commercial school board." The mayor and the principal of the school concerned are *ex-officio* members of this body. A special advisory committee of eighteen members—instructors or school principals and representatives of industries—is appointed by the Ministry for a term of four years, to assist in preparing the course of study for the industrial and commercial schools and for the purpose of advising in other matters of importance. This committee as well as the Higher Industrial School Council is presided over by the President of the Central Bureau.

The Act above outlined expressed the results of years of experience, and the careful thought of industrial employers, workers, and educationalists. Naturally enough the first statement of the need for more thorough industrial training originated outside of the ranks of schoolmen. Wuerttemberg, lacking coal and water-power and the other special facilities that tend to aid industrial expansion, was forced to rely upon a better quality of manufacture instead of looking to quantity alone. It was necessary to lead in this respect to avoid industrial ruin. Earlier experience had taught what the industrial schools might be expected to accomplish in the way of promoting efficiency. The experiment of day-school classes, for the same length of time, produced results immeasurably greater than did the evening classes held in the same cities. The day vocational school proved to be as far ahead of the evening school as the latter was in advance of the limited Sunday instruction. It was argued that the business of learning is a delicate one, requiring for its complete success an active, unwearied brain. The pupils were too fatigued to accomplish the best results in the evenings—that they put forth supreme efforts, all agreed. The evening classes are as successful as could be expected, in Wuerttemberg, as in the other German states, in France, and in England. But it was agreed that Wuerttemberg must take an advanced position in respect

to vocational training if it would keep well to the fore in the industrial contest.

The compulsory attendance requirement was not planned wholly as a means of increasing the number of students in the vocational schools—it was pointed out that only four or five thousands more would be added to the school attendance through this provision,—it was rather intended to make the day schools possible by removing the restraints that might be imposed by certain employers, parents, and guardians who might otherwise not be willing to release the young workers each week at a period in which they could be profitably employed in the business. Also it was desirable that the Higher Industrial School Council should be able to say to a commune: “You must provide the opportunity for industrial training, by the erection and maintenance of a vocational school.” Wuerttemberg already has a considerable number of industrial schools made compulsory by vote of the localities. Several of them owe their origin to the fact that the communities are chiefly industrial, and that the state appropriation to the industrial schools is more than that made to the general improvement schools—hence by making attendance compulsory the general improvement school may be done away with altogether.

By 1904-'05, there were 22 compulsory industrial improvement schools out of a total of 150, and two compulsory commercial improvement schools, in a total of four. However, the attendance in the non-compulsory schools of Wuerttemberg has been very fair. They have been more common in the larger places. While the 22 compulsory industrial schools of 1905 averaged about 61 enrolled, the 128 optional schools averaged 134. Similarly, the two compulsory commercial schools averaged 112, to the average of 510 in the two non-compulsory commercial improvement schools. A large percentage of the communes in Baden have succeeded in passing the compulsory requirement made possible under the Imperial law.¹ In 1904, Baden had 47 highly developed industrial

¹ The Imperial ordinance made it possible for a commune to decide upon compulsory attendance for industrial improvement schools without the necessity of awaiting the action of the state. A committee of the Imperial Reichstag in 1906 outlined a further step by calling for suggestions from the various governments looking toward the final en

schools, 102 lesser industrial improvement schools, and 11 commercial improvement schools, of which only three of the industrial schools had not been made compulsory. Likewise in Prussia, in 1903, out of 1209 industrial improvement schools with 189,068 students, 1082 with 156,757 students had been made compulsory, and of 273 commercial improvement schools with 29,765 pupils, 182 with 18,509 in attendance had been made compulsory. Berlin, notably, has introduced compulsory attendance for young workmen, and has entered upon a similar project in the case of young women employed in the industries. Bavaria, in 1904, had local compulsory attendance provision for 217 of 301 industrial improvement schools. Munich, with its constant quota of 6000 apprentices, has for several years enforced a compulsory attendance regulation for industrial schools. Mecklenburg-Schwerin, through an ordinance which went into effect on April 13, 1905, has succeeded in making the industrial schools compulsory to about the same extent as Baden.

The recent Wuerttemberg law goes farther than the others and makes attendance compulsory for all communes having at least forty workmen under eighteen years of age. While the new law will apply to several communes that have not yet established industrial improvement schools, it affects only 101 of the 136 communes which had such schools in 1903. That does not mean that the remaining localities may not continue to maintain industrial improvement schools—they only need to comply with the provisions of the law and to secure the approval of the Higher Industrial School Council in order to receive a share in the state funds devoted to the purpose. The compulsory requirement takes into account the number of workers employed in a community. This seemed more practical than to take the total population of a locality as a basis, because of the differences in the development of the various industries and because of the greater convenience in obtaining attendance at school in the same locality in which the worker is employed.

Local conditions are to determine whether young men working in certain unskilled industries or as apprentices to butchers, bakers, tanners, dyers, barbers, and hotel men, shall be held to attendance in the industrial, or in the general improvement actment of an Imperial compulsory law that will not be optional—a law similar to that of Wuerttemberg—to be applied everywhere in Germany.

schools. There is no question but that the apprentices in industries requiring greater skill will be given first attention in the industrial improvement schools. Those belonging to unskilled industries will at least be excused from drawing, in many instances, although an argument against such a move has been advanced in some localities. It is claimed, for instance, that the bakers' apprentices rarely stay in the business until the age of thirty, because the wages are too low to permit them to marry, and so they change to some more remunerative trade requiring greater skill. The principles of industrial drawing are considered most practical for application in almost any skilled industry. Hence many communes will require industrial drawing to be studied by all. Those communes which do not do so will be influenced chiefly by financial reasons.

The day attendance and compulsory features of the new law received some opposition from small industrial employers who feared that their business would be disadvantaged through the loss of the time of their employees. The opposition of these men was more than counterbalanced by the action of the *Handwerkskammern*, or unions of small industrial employers, which voted overwhelmingly in favor of the law.

Commercial schools will be opened side by side with the industrial schools in the larger cities only—perhaps in none other than those already equipped with similar schools. In some smaller places, commercial classes may be organized in the industrial schools. The German states have long been accustomed to make commercial education a matter of government concern. Bavaria, by law of 1873, directed that private commercial schools should only be erected after the approval of the government had been obtained. Saxony decreed likewise in 1880, and Baden has a similar law.

The work of the industrial improvement schools in Wuerttemberg has hitherto been chiefly in the hands of a body of instructors who, though very excellent in their special lines (and holders perforce of state certificates in proof of this fact), have been principally employed in other schools or in business vocations,¹ and have carried on the industrial teaching as a side

¹In 1905, there were 654 drawing instructors connected with Wuerttemberg industrial improvement and "women's work" schools, and 952 teachers of other subjects engaged in these and the commercial improve-

issue. Under the new system the standards, ever high, have been raised considerably. The teaching of elementary industrial subjects has been elevated to the dignity of a profession sufficient unto itself. In order that only those with the highest qualifications may be permanently placed, it has been considered inadvisable to establish the schools on the new basis until provision for an even better trained corps of teachers has been made. Herein lies the all-important reason for setting the period for the principal reconstruction of the industrial improvement schools at 1909 to 1912. School boards that anticipate the new regulations by petitioning to have their institutions put on the new basis at once are frowned upon. Wuerttemberg, a country which has afforded the opportunity for elementary vocational teaching for several generations, confesses that it has not a force sufficiently trained to equip the schools under the new standards. The excellent vocational instruction of the present is branded as wholly inadequate. What is to be done?

The state, through the Central Bureau for Industry and Commerce, and with the co-operation of the Educational Ministry, is providing for the further training of a chosen corps of teachers, selected by the Higher School Boards. Thirty-eight such candidates for the industrial improvement schools were sent to the Normal Training Division for Industrial Teachers of the Grand Ducal Building Trades School of Karlsruhe, Baden, in 1906, and twenty or more other individuals will be added to the number each year until a full and sufficient quota has been obtained. About one hundred such trained instructors are needed for the first year of the operation of the new law. The candidates sent to Karlsruhe are from the best of the men teachers in the common schools, as a rule, though the "realistic" schools and expert practitioners are also represented in the lot. The ages are twenty-six to thirty. At Karlsruhe the course is

ment schools. Only a few of the teachers of drawing (20 men and 2 women) alone, were chiefly occupied in these schools. The others were performing the work as a secondary occupation (*Nebenamt*). The handicrafts associations of Wuerttemberg were unanimously in favor of changing these conditions so that the great majority of the teachers of the industrial improvement schools—especially in the larger towns and cities—should be permanently appointed (in *Hauptamt*) by the state to devote their chief attention to this work. Under the new law this is a settled policy.

three and one-half years in duration. The candidates from among the teachers have already had the pedagogical training of a normal school course. The men are also obliged to spend six months in practical work. This is done during the vacation months—August and September—of the ensuing summers.

The choosing of common-school teachers, for the most part, for this work is rather the outcome of reasons of expediency than of any other causes. Skilled practitioners in the vocations, men at the same time of broad intelligence, who would make good instructors, are equally desirable but harder to get. Such men would be obliged to take a course of at least one year in pedagogical subjects, whereas the ordinary teacher, lacking thorough technical training in vocational subjects, is obliged to attend a higher vocational school for three and one-half years, with an added six months of practical working experience. In Prussia, teachers have been prepared for vocational instructing in three or four months, but the Wuerttemberg employers of skilled labor would not agree to this. They desire that the teachers shall be practical in the highest degree, since they (the employers) must make sacrifices under the new law. The candidates at Karlsruhe receive an annual stipend of \$240 from the Wuerttemberg government, a sum quite sufficient for their actual needs, since living expenses and tuition are low, and the two capitals are only two hours apart by fast express.

It is natural to ask why the industrial teachers do not receive their higher training at the Building Trades School of Stuttgart, a school which in many particulars is rated as the best of its kind in Germany. The answer is not far to seek. It is not in disparagement of the work of the Stuttgart Building Trades School—many of whose graduates are already in vocational teaching in Wuerttemberg—that the candidates are sent to an adjoining state, but simply because Karlsruhe has developed an unusually good Normal Training Department (established in 1882) and is better equipped for undertaking the preparation of teachers of elementary industrial subjects. The Stuttgart school does not seem to care to undertake this work. At Karlsruhe those in the Normal Department also take up subjects in the Electrical, Mechanical, or Constructive Engineering Departments, according to the specialty chosen. In addition the students have extended courses in higher mathematics, physics,

descriptive geometry, industrial drawing, and designing. Students entering the Normal Division are required to have had a common normal school course, or the equivalent of the sixth year's course of a "middle school." The earliest age for entrance is eighteen. Graduates of a normal school must have taught, also, and must produce evidence that they have worked at industrial employment for at least eight weeks. Others are required to show evidence of at least six months' practical work. The matriculation fee at Karlsruhe has been \$1.20; the tuition, \$7.20 per semester; the laboratory fee, \$4.80 per half-year.

The teachers intended for the reorganized commercial improvement schools will be sent to such German universities as Leipzig, which is especially strong in commercial subjects, for their training. Also, a preparatory course for such teachers, of about three semesters in duration, was established at Stuttgart in the spring of 1907. Commercial teaching candidates will be selected from among the teachers in *Realschulen*, or from practical workers of rare ability. A few will be sent to America for training in commercial school methods. In electrical engineering, too, Wuerttemberg is looking to the United States for ideas, and already has a student teacher here, with others to follow.

↘ In the future, as in the past, drawing will be by all odds the most important subject taught in the industrial schools. In both industrial and commercial schools the other basic subjects will continue to be: (1) Arithmetic (industrial or commercial); (2) German (including business correspondence and forms, suited to the special school); (3) bookkeeping (industrial or commercial). With these as a basis, the instruction will be differentiated in the necessary directions. As far back as 1889, the subjects studied most were free-hand drawing and painting—taken by 50 per cent. of the students in the 168 industrial improvement schools for men in Wuerttemberg at the time; industrial arithmetic, 35 per cent.; German (including business forms, etc.), 32 per cent.; special technical drawing, 29 per cent.; geometrical drawing, 21 per cent. At the same time, in the 168 industrial and commercial improvement schools, the 15 industrial improvement schools for women, and the 16 "women's work" schools, instruction was given in the following subjects in the number of schools indicated by the figures: industrial arithmetic,

142; commercial arithmetic, 19; geometry and geometrical computation, 33; descriptive geometry, 76; geometrical drawing, 152; special technical drawing, 138; free-hand drawing, 179; theory of style and color, 4; modelling and woodcarving, 22; engraving and chiselling, 3; physics, 47; chemistry, 5; engineering, 3; mother tongue (esp. business forms), 152; penmanship and orthography, 60; stenography, 7; industrial bookkeeping, 99; commercial bookkeeping, 12; exchange, 6; French, 38; English, 19; Italian, 2; politico-economic subjects, 34; commercial geography and history, 20; German literature, 6; house-keeping materials, 2; hygiene, 2. The various subjects were still further differentiated into courses intended for single or allied industries.

The program of the Stuttgart Industrial School at the present time, one of the best of its kind, is outlined in another chapter. When the new plan is in force, what are known as common school subjects will be eliminated from the programs wherever possible. That is, when arithmetic is taught, it will be industrial or commercial arithmetic, and similarly in the case of the other subjects. At the time the recent law was enacted an effort was made by representatives of the Church to introduce obligatory instruction in religion—such as the common schools of Wuerttemberg and the other German states require—into the programs of the industrial improvement schools, but the attempt failed. In general the policy was adopted of excluding all general culture subjects. In Baden, Bavaria, and Prussia, an effort in the same direction—to exclude the general culture subjects from the curriculum of the industrial improvement school—has recently been made. As late as 1905 Prussia repulsed a proposal to introduce the teaching of religion as an obligatory subject in the industrial improvement schools.

The Higher Industrial School Board of Wuerttemberg will insist that the instruction given shall be spread over the ten months of school if possible, in order that the theory gradually acquired may be reinforced step by step through practical work in the industry, and that the whole curriculum may not be hurled at the luckless students during the off months of the season, when there is neither the opportunity for theory and practice to go hand in hand, nor the time to grasp thoroughly the instruction offered. Effectively opposing the few near-sighted employers who would

have the instruction lumped into the dull months of the year the Higher Industrial School Board recommends, and will enforce in so far as is practicable the provision that instruction shall be given throughout ten months at the rate of at least seven hours per week, preferably on two afternoons out of each seven days. The minimum of 280 hours per year for three years is in lieu of the present average of 180 hours for each of two successive years. The practical work is to be done, in general, in the workshop of the employer. However, the industrial improvement schools of the larger towns will be equipped with their own workshops, for special purposes.

The industrial and commercial improvement school boards will continue the general policy of demanding a small tuition fee, although this will be altogether done away with in a few communes. The fees will average only 24 to 48 cents per term in the majority of the schools. As it is, the state will have an increase in the annual expenditure of about \$60,000 to meet, according to Minister Weizsaecker, by the year 1912, when the law will be in full operation. This does not include the extraordinary items appropriated for building. Wuerttemberg has for many years paid more per head of population for industrial improvement schools than the neighboring states. The central apportionment for these institutions a few years ago averaged in Wuerttemberg approximately \$0.06; in Baden \$0.05; in Bavaria \$0.03; in Saxony \$0.0075. At present the Wuerttemberg central government pays out \$73,000 to \$75,000 a year for the industrial and commercial improvement schools and for the "women's work" schools. The amount of tuition paid in is somewhat less than this and the communal share in the maintenance is practically the same as that of the state. All three items must be added together to give the total expenditure upon the schools of this kind. Tuition fees in general have not changed materially since 1888-'89, when the Stuttgart commercial improvement school demanded \$12 to \$14 per year,¹ and the industrial improvement schools were charging as follows: three of them, a tuition of \$3.57 to \$9.33 yearly; one, \$2.86; one, \$2.38; one \$2.15; two, \$1.90; three, \$1.42; two, \$1.19; fourteen, \$1.02

¹ Now \$3.60 for compulsory course, or \$1.44 per single hour weekly running through the year, when subjects are chosen, but in no case to exceed \$9 per year.

to \$1.25; thirty-six, \$0.58 to \$0.71; fifty-nine, \$0.24 to \$0.58; forty-five, less than \$0.24, or even no charge at all. The chief argument advanced in behalf of the tuition fee is its beneficent effect on the pupils themselves, who are said to appreciate more thoroughly that which they pay for, even if the fee be very small. However, the principle of charging a tuition fee is carried out in connection with all the public schools of Wuerttemberg, in general, of whatever nature. Communes have the power of doing away with the tuition, with the approval of the higher boards. They are usually expected to assume the deficit that such action would cause. Stuttgart has in recent years done away with the tuition in the common or "people's" schools. In such institutions the tuition is often as low as \$0.24 per year, and in no case is it what one might term a high fee.

The question of the increase in efficiency through attendance at an industrial or commercial school has long ago been placed beyond the pale of doubt in Wuerttemberg. It is now accepted as a matter of course, and some statistics gathered at first hand from employers, apprentices, and parents, by the present writer, confirm the soundness of this belief. In a word, the employers are uniformly enthusiastic over the results obtained through these schools and the workers are similarly minded. The institutions make it possible for all, who are willing, to obtain employment. The higher quality of the work that is done enables the manufacturers to compete successfully in the markets of the world, and even in times of general depression to keep their workers employed at a wage which, for Europe, is very good, and advances according to skill. For years it has been extremely difficult for the few young men who have not had the advantages of a vocational school training, and who do not show a disposition to avail themselves of its opportunities, to obtain work from intelligent employers. As final proof, we must remember that the vocational school laws of Wuerttemberg have ever been chiefly instigated by business men, and that the recent advanced legislation in this direction is mainly the work of employers, guided by the helpful counsel of President von Mosthaf of the Central Bureau for Industry and Commerce, a department of the Interior Ministry in this little Kingdom which is in more effective relations with the producing interests of the country than any other agency I know of the

world over. The Educational Ministry, it might well be said, merely furnished the pedagogical trimmings of the Bill.

Some further discussion of the part taken by the state and by the commune in the maintenance of industrial and commercial improvement schools, and concerning the salaries of the individual teachers, the sale of objects manufactured in the industrial schools, the attitude of the unions, and kindred topics will be found in the succeeding chapters.

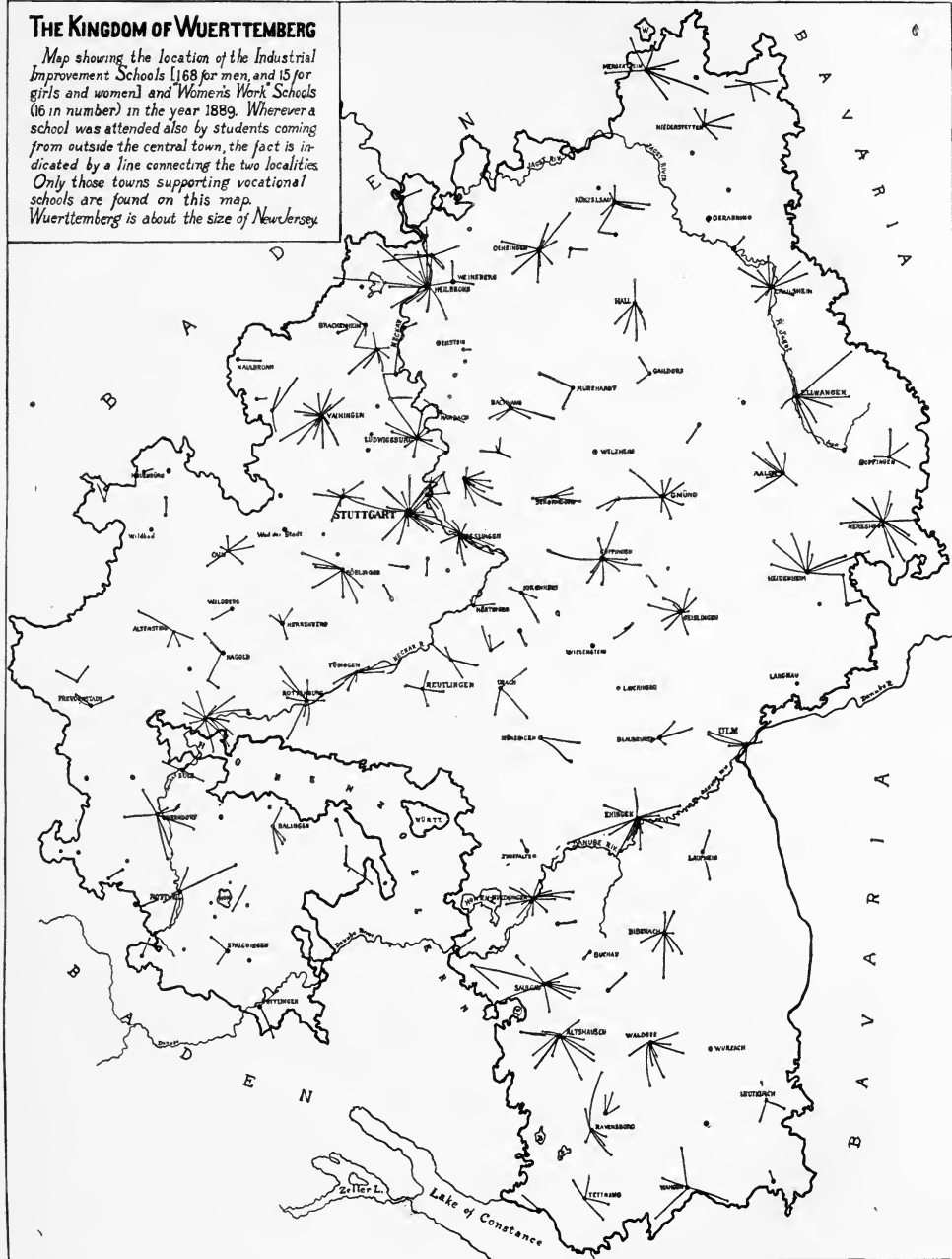
CHAPTER IV

THE INDUSTRIAL SCHOOL OF STUTTGART, AND THE COMMERCIAL SCHOOLS

Located in the metropolis of a kingdom that is distinctly in the lead for the universality of its elementary industrial training, the Stuttgart Industrial Improvement School, as an example of a highly developed institution of its kind, is worthy of close study. In this industrial center and capital there is every advantage for obtaining skilled instructors. And the quality of the work done here is not to be measured by the character of the plain building—an anomaly in Stuttgart school architecture—in which the classes are for the most part housed. That it is opportunity that draws students hither is evidenced not alone by numbers, but by the earnestness of the work that is done and by the attendance of many pupils of advanced years. In 1906, 1600 men and 346 girls and women were in attendance. The commercial improvement school is an institution entirely separate in Stuttgart. The Industrial School offers the opportunity to fulfil the conditions of the compulsory improvement school law, and in addition gives extended courses for all industries and ages. For some time it has afforded: (1) day courses on working days; (2) evening courses on the evenings of working days; (3) special technical courses for the separate trades and industries; and (4) evening courses for girls and

THE KINGDOM OF WUERTTEMBERG

Map showing the location of the Industrial Improvement Schools (168 for men, and 15 for girls and women) and Women's Work Schools (16 in number) in the year 1889. Wherever a school was attended also by students coming from outside the central town, the fact is indicated by a line connecting the two localities. Only those towns supporting vocational schools are found on this map. Wuerttemberg is about the size of New Jersey.



women. The evening courses classify into elementary and special technical divisions. Pupils under seventeen are at present obliged to consult the direction of the school as to choice of subjects studied. Any course taken up must be continued to the end. Those in the elementary course must study all subjects belonging to the division. The compulsory improvement school law is at present complied with when a pupil is: (1) enrolled in the elementary division; (2) in the special technical division, and taking at least 100 hours of scientific subjects per year; (3) in the day courses, or in the special courses. Pupils are required to be punctual and regular in attendance. Fifteen minutes after the session commences the doors are closed and tardy students are not admitted thereafter. But, for that matter, regularity and punctuality in attendance have long since become automatic in Wuerttemberg. The courses begin October 1. Summer holiday months are August and September.

The 1600 boys and men in attendance at Stuttgart in 1906 represented 85 separate trades and industries. Only 15 individuals had not yet chosen a vocation. The following trades and industries were represented in greatest numbers: mechanicians, 175; locksmiths, 171; cabinet-makers, 150; painters, 94; upholsterers and paper-hangers, 62; printers, 51; bookbinders, 49; servants and errand boys, 46; fine mechanics, 45; gardeners, 43; typesetters, 43; carpenters, 41; electrical engineers, 41; architects, 35; sculptors, 33; tinsmiths and braziers, 25; zincographers, 24; engravers, 24; lithographers, 23; glaziers, 22; masons, 21. Each of the other trades and industries was represented by less than twenty.

In the special technical divisions were 236 male students under 17, and 270 over 17; in the elementary division, 881 males under 17, and only 4 over 17; in the day and special courses, 158 males under 17, and 51 above that age. Fifty-eight pupils came regularly from beyond the city limits.

The following table, showing the training received by the 1946 students in the Stuttgart Industrial School, prior to their confirmation in the church, is interesting as indicating the source of those engaged in industrial occupations:

Pupils Enrolled	Common School	Middle and "Buerger"-School	Real-School	Latin School and Gymnasium	Higher Girls' School	Total
In the Special Technical Division	353	74	66	13		506
In the Elementary Division	822	33	26	4		885
In the Day and Special Courses	155	27	23	4		209
In the Courses for Girls and Women	208	21			117	346
Totals	1,538	155	115	21	117	1,946

It will be seen that fully 79 per cent. of the industrial pupils are from the common schools, and about one per cent. had early training in a classical school for boys.

The day courses are divided into : (a) the instruction given in the public drawing salon for free-hand drawing, industrial art drawing, and decorative painting; (b) afternoon instruction; (c) instruction in water color.

Each subject in the first-mentioned division is given in two courses, the one throughout the year and the other a six months' course from October to May, exclusive. The drawing salon is open daily from 8 A.M. to 12 M., and from 2 P.M. to 4.30 P.M., Saturday afternoon excepted. The public drawing salon is found in the larger towns of Wuerttemberg. The instructors have their studios in adjoining rooms, and inspect and direct as needed the individual work that is being done by pupils in the larger hall. The instruction given in free-hand drawing in the Stuttgart day course is intended for advanced pupils. That given in special technical drawing presupposes practical vocational experience. The ten months' course was given to 15 pupils in 1906, and the six months' course to 8 pupils. The tuition in this division is \$2.40 to \$3.57 per semester (depending on time of entrance) for all subjects. The day courses in technical drawing are for carpenters, stone cutters, masons, locksmiths, and gardeners—geometrical and projective drawing with reference to the trade concerned. Then comes the working

out of plans and working drawings in accordance with models and sketches taken as subject-matter.

The afternoon instruction is given on four week-days from 5 to 7 P.M., and on one from 4 to 7 P.M. All branches of free-hand drawing are taught, as also arithmetic, composition, and bookkeeping. Tuition \$1.20 to \$2.40 per semester, giving access to all subjects.

The evening courses have hitherto been divided into an elementary division and a higher technical department. The former was especially intended for pupils coming under the provisions of the industrial improvement law, and will in the course of events be transferred to the daytime. The instruction was given in 1906 during the six winter months, from 7 to 9 P.M., in two successive yearly courses (to be increased to three). In the first course, those pupils engaged in industrial pursuits are received at the age of fourteen directly after their confirmation in the church, and subsequent release from the common schools. In the second course are either graduates of the first, or pupils who have elsewhere received the requisite instruction. Pupils of the elementary division are obliged to take all the subjects in a given yearly course. For bakers, waiters, cooks, butchers, musicians, dentists, clerks, vintners, coachmen, servants, and errand boys the instruction in drawing is optional. The elementary courses prepare for the special technical courses. The tuition is \$1.43 per year. The first year's course was given in 19 parallel classes in 1906, with two hours each weekly in free-hand drawing, geometric drawing, industrial arithmetic, and composition, and one hour each per week in bookkeeping and penmanship. The average number in each one of the parallel classes was 27. The second year's course was given in 16 parallel classes, averaging 21 each, with two hours weekly in projective drawing, arithmetic, and composition, four in free-hand drawing, and one in bookkeeping. A course without drawing (with civil government added) was given to 29 pupils.

The courses of the "technical" division, in the evening, offer the opportunity for intensified instruction along higher special lines. Pupils of this division, whose age is seventeen or more, and who are sufficiently prepared, may choose their own subjects. Instruction is given in the months from October to May, exclusive, from 7 to 9 P.M. The instruction in drawing and

modelling, however, is continued throughout the year. Tuition is \$2.40 for six or eight months, and somewhat less for fractional periods. On the list of subjects are: free-hand drawing, ornamental drawing, blackboard sketching, modelling, geometrical drawing, projective and descriptive geometry, from two to six hours each per week; mechanical drawing (6), business forms (2), industrial arithmetic (4), elementary geometry (4), engineering (4), physics (4), electrotechnics (4), French (6), ornamental penmanship (2), industrial art ornamentation and style (2), industrial bookkeeping (1), stenography (1), penmanship (1), civic instruction (1), and industrial drawing (4 to 6). The last-named subject is taught in five divisions and eight classes as follows: (a) For cabinet-makers, glaziers, turners, tinsmiths, etc.; (b) for architects, carpenters, stone-cutters, and masons; (c) for locksmiths, etc.; (d) for skilled mechanics, electricians, and watchmakers; (e) for upholsterers, paper-hangers, and decorators.

Under the heading of special technical work, courses are established for gardeners, printers, and compositors, with especial reference to the needs of such students. The courses for printers and compositors are given in the daytime (from 7 to 10 A.M.) and the courses for gardeners partly during the day (Sunday, 10.30 A.M. to 12.30 P.M.) and partly during the evening (on work-days, from 7 to 9 P.M.) The former courses continue throughout the ten months, whereas the instruction for gardeners is of only four months' duration. Tuition \$1.20 and \$1.44, respectively. The gardeners study drawing, painting, composition, industrial arithmetic, bookkeeping, and penmanship. The courses for printers and compositors are of two years, duration, and comprise work in Latin and French (for compositors), German, bookkeeping, industrial arithmetic, and drawing.

The courses for girls and women are given in a "scientific" and an industrial art division. The "scientific" department affords the regular industrial improvement work for girls and women, whereas a special industrial art division occupies the place that is filled for the other sex by the Industrial Art School. In the scientific division, composition, bookkeeping, arithmetic, and penmanship must be taken together. The other subjects—French, geometric drawing, stenography, English, geography, history, hygiene, and German literature—are optional. The

instruction lasts throughout six months except in the case of the language subjects, which extend over eight months. On work-days the instruction is given between 2 and 6.30 P.M. The group subjects named above were taught in 1906 in eight divisions, with a total attendance of 210. Each of the four subjects required two hours weekly, except penmanship, one hour.

The industrial art division for girls and women is established in a separate building, but like the scientific division is under the same management and direction (*Rector*) as the department for men. A large proportion of the students of the industrial art division for girls undertake the work for their own pleasure, although many of the graduates find profitable employment in art industries, and others, after a four years' course, take the state examinations and become teachers of drawing or of industrial art. The winter course extends over six months, and the summer course for four. The instruction is given in the daytime. The tuition depends on the subjects chosen, but cannot exceed \$6. A workshop, for practical application of the theory learned in the classroom, is attached to the institution. Fine lacework, wood-carving, and the making of pottery are the principal subjects for practical effort. The pupils pay for the colors. Other materials are furnished gratis. Some of the products are sold for the profit of the school, but the amount made in this way is small. Such sales occasion no adverse comment on the part of those regularly employed, as the school does not manufacture articles in large quantities. It is all individual work, done by hand. Pupils are paid a percentage on what is sold. Courses are given in this division in elementary geometrical drawing, projective geometry, perspective, free hand, the study of draperies, industrial art drawing and painting, landscape drawing and water color, wood-carving, art embroidery, ceramic art and painting on glass, studies of the state collections, sketching in the Industrial Museum and in the Royal Cabinet of Natural Curiosities, figure drawing, drawing from the nude, theory of ornamental and architectural structure, and the history of art.

An examination of the official programs discloses the fact that thirty-six of the instructors (out of about 125) in the division for male students of the Industrial School of Stuttgart and

three instructors in the division for girls and women are skilled individuals engaged in the active practice of the chosen work, in addition to teaching. Among the other instructors are a few principals of *Real*- and common schools, a few *Real*-school teachers, and a larger number of instructors from the common schools. All are specialists.

The fifteen industrial improvement schools and divisions for girls and women in 1905, in Wuerttemberg, enrolled 1042 pupils. The number of these institutions is about the same as it was twenty years ago. However, the "industry schools" for girls enroll upwards of twice as many now as then, and are much more efficient. A larger number of the female sex also go in for the "women's work" schools, which have a total enrolment over six times as great as that of the industrial improvement schools and divisions for girls and women. Opportunities for higher commercial instruction are offered in the higher girls' schools.

Summary of the chief events in the history of the Stuttgart Industrial School: In 1825, the Sunday Industrial School opened in two separate parts of the city, and united, 1828. Evening Industrial Improvement School established, 1854. Separate division for girls and women (first in kingdom under public schools system) opened 1861. Day courses for male students grew out of earlier "public drawing salon" courses of the Central Bureau for Industry and Commerce, and have been an integral part of the City Industrial School since 1879. Elementary division organized, 1883.

The receipts and expenditures of the Stuttgart Industrial School, in the estimates for 1906, were as follows: Income from tuition, \$4308; expenditures, \$36,607.72 (salaries \$30,788.84; other maintenance, \$5818.88). The city paid special items (tuition remitted, etc.), to the amount of \$785.60, and the balance, \$31,514.12, was paid for equally by the city and by the state. There were nearly 3150 industrial school pupils in the greater city. Leaving the expenditures of the state out of consideration, the average cost per pupil to the city itself was about \$6.71 in the older city, \$3.57 in the included suburb of Untertuerkheim, and \$2.32 in the newly annexed Cannstatt.

The principal of the Stuttgart Industrial School is paid a salary of \$1024 per year, with additional "indemnities" amount-

ing to \$190. Next to the principal, the instructor in charge of the public drawing salon receives the highest salary—only \$1095 per year. The instructors are in general paid according to the number of hours taught, at the usual rate of about \$.75 per hour (in Stuttgart), ascending to \$.85 or in rare cases to about \$1.00 per hour. These prices seem very low in comparison with American rates, but compare very favorably with other pay in a country where living expenses are low. The usual pay in the general or Sunday improvement schools in Wuerttemberg is \$.24 per hour.

The commercial improvement schools in Wuerttemberg are five in number—at Stuttgart, Cannstatt, Esslingen, Heilbronn, and Ludwigsburg. Besides these there are commercial divisions in connection with 17 industrial improvement schools of the kingdom. The school at Stuttgart is the most important one. It was founded in 1854, and was taken over by the city in 1892. The most interesting fact in its regard is that it became a compulsory school in 1905. Like three of the other cities having commercial improvement institutions, Stuttgart passed a local law making all young men under 18 years of age engaged in commercial pursuits liable for attendance during three years at the institution named. The state law of 1906 included the commercial workers in the general compulsory law which goes into full effect from 1909 to 1912. The Stuttgart commercial improvement school will have its third year added to the compulsory course in 1907. The attendance required is six to eight hours per week, depending upon the year of the course. The minimum will be the same as for the industrial improvement schools after 1909. Merchants in Stuttgart express their displeasure at being obliged to do without their employees for the required time each week, but it is evident that the sentiment is becoming more favorable to the new régime with the lapse of time. The employers are obliged to pay the tuition of their apprentices of the statutory age. The amount is only \$3.57 per year.

The school is coeducational and has about one thousand pupils, of whom about seventy are girls. The latter are said to be very diligent pupils. The students are housed in one building, instead of being divided among several as in the case of the industrial improvement school. In addition to the day

courses for compulsory subjects there are optional courses given in the mornings (6 to 7 in summer, and 7 to 8 in winter) and evenings (7 to 9). Summer holidays extend from July 25 to September 5. The compulsory students may be freed from attendance if they frequent another school of equal rank in commercial subjects, or whenever they are able to pass the final examinations. Non-attendance is punishable by fines—up to \$36 in cash, or four weeks in prison. Note that the fines are levied against the employer, parent, or guardian responsible for the non-attendance.

The lower year of the compulsory division contains three subjects, each requiring two hours per week. They are: business penmanship, mother tongue, and commercial arithmetic. In the middle year, courses are given in commerce, commercial correspondence, commercial arithmetic, and bookkeeping. The higher course is to be established in 1907-'08. Elective subjects are: German style, French, English, Italian, French commercial correspondence, English commercial correspondence, commercial geography and commercial history, commercial and exchange law, political economy, tariff, stenography, drawing, and physics. The subjects of the compulsory division may also be elected. There are twelve classes in French and five in English at present. Tuition for the electives is \$1.43 per week hour carried through the year, with a maximum charge of \$8.57 per annum. Because of the higher tuition charges, the deficit in the budget of the Stuttgart commercial school, in 1906, was, in proportion to attendance, much smaller than that of the industrial school. The tuition for the former institution amounted to about \$6000, and the final deficit paid by the city was about \$5000. To this add the \$500 deficit of Cannstatt. The state's share in the maintenance is on the same basis as in the case of the industrial improvement schools.

The Higher Commercial School (or College) of Stuttgart is an institution occupying in the three years of its lower courses the same rank as a Wuerttemberg *Real*-school with a six years' course, and in the particular alone that it is authorized to give a certificate, upon completion of the lower division, releasing from all but one year of military service, it is under the supervision of the Ministerial Division for Higher Schools. Otherwise it is a private school administered by a body of merchants and

industrialists. While the lower division is entitled to add but a few special commercial subjects, the higher department affords a thorough theoretical training for commercial pursuits. The school receives a state subsidy of \$500 annually, and a city grant of \$300. The tuition is \$37.50 to \$75 per annum. The institution was founded in 1871 with 25 students in attendance. There were about 125 at the time of the last report—a fifth of them in the higher division. Similar schools without state support are found in Calw, Kirchheim, and Ulm. They are allowed to prepare for the granting of the special military certificate.

CHAPTER V

OTHER INDUSTRIAL SCHOOLS, AND THE CENTRAL BUREAU FOR INDUSTRY AND COMMERCE

It has been seen that the lowest form of industrial training in the Wuerttemberg school system is that of the "industry school"—the name for the industrial instruction given in the common or "people's" schools, chiefly to girls. For boys, the manual training in the common schools is confined mainly to drawing. Together with the opportunities offered in the lower grades of the *Real-* schools this represents nearly all that is done by the state in the direction of industrial or commercial instruction for those under fourteen years of age. Up to this period the industrial teaching is systematic, but somewhat restricted in point of time. Each species of school in the Wuerttemberg system has a very special purpose. That of the common schools is thorough instruction in religion, and together with this a comprehensive grounding in the "three R's." The authorities insist that this program shall be adhered to, and that the purpose of the common schools shall not be defeated by the introduction of an undue amount of vocational instruction. Early differentiation of courses is brought about in the choice of a school, the "realistic" type of institution introducing early the study of modern languages, more mathematics and science, whereas the gymnasial type begins early with the classical languages. Both are altogether different from the common schools, yet none of these schools gives early vocational instruction. The proposal to introduce "preparatory industrial schools," such as may be in-

stanced by the Imperial *Handwerkerschulen* of Austria, or the "pupil's workshops for the eighth classes" of the boys' schools in Munich, admitting students from the age of twelve, has not met with favor in Wuerttemberg, although for nearly thirty years the state and the city of Stuttgart have subsidized a private venture of this kind in the metropolis—the Ritter Industrial Preparatory School. This institution receives pupils at the early age of eleven, and affords them opportunity for training in industrial drawing and theoretical subjects until they enter upon the active practice of an industry. Practical manual training in wood and metal working, which forms a feature in the curricula of the Austrian and Bavarian schools cited, is not found in the program of the "Ritter" establishment.

The industrial and commercial improvement schools, already described, take pupils under the compulsory law up to the age of eighteen, and in the larger localities offer optional courses in special technical subjects for all individuals, having the prerequisite training, who wish to attend. Similar in technical rank are the "women's work" schools. With the exception of two or three which are under the auspices of unions, they are communal institutions, and like the industrial and commercial improvement schools are under the Royal Commission for Industrial Improvement Schools, and receive state as well as communal support. The Royal Commission is as it were a committee of the Central Bureau for Industry and Commerce (Interior Department), although nominally under the control of the Educational Ministry. The influential President of the Central Bureau presides over the Royal Commission (and its successor the Higher Industrial School Council). Its offices are in the magnificent Royal State Industrial Museum, (see frontispiece) the triumphant creation and the headquarters of the Central Bureau, as well as the abode of the Royal Commission for Agriculture, in charge of the agricultural schools. Directly under the Central Bureau come the middle industrial schools—the special technical institutions (mono-technical) for the textile industry, weaving, embroidery, watchmaking, electro-technics and fine mechanics, and other industries, and special courses given by experts under its auspices. The Building Trades School, Industrial Art School, and Technical College are directly under the Educational Ministry.

The purpose of "women's work" schools is to train grown girls and women in the field indicated by the title of the institutions. The work in these schools includes everything from plain sewing to artistic embroidery requiring the skill that is exacted of those in industrial positions or of instructors in these subjects. There are 33 of these schools in the kingdom, and in 1905 they enrolled 6858 students. Drawing is the basis for all work done here. The "women's work" schools originated in Reutlingen. The first one grew out of the embroidering of a flag designed by a local artist, in 1863. When the work of embroidering the standard was attempted the artist found that his designs were not comprehended by the women assigned to the task. Nor did the artist understand all the features of the practical side involved. As a result, a short course in drawing was given to those women who became interested. Soon instructors were secured to give courses in embroidery, crocheting, and knitting. When in 1865 the industrial stress made it difficult for the workers to spare the necessary time, the Central Bureau came to their relief by affording stipends for attendance. In 1868, an "industrial drawing school for grown girls," with a six-months course, was established. Not until the following year were the drawing and the practical instruction united in a satisfactory manner. Within five years, as many classes—for plain needlework, machine stitching, dressmaking, knitting, and embroidery—were established. Courses in bookkeeping, correspondence, and commercial arithmetic were also adjoined. The Central Bureau equipped the school with up-to-date machines. From about this time the present name was adopted. The Reutlingen school established a training department, soon to be visited by students from other German states and abroad. Other "women's work" schools were established throughout Wuerttemberg, the cities and towns and the state each taking a share in the maintenance.

The local common councils name the members of the special board for each of these schools, and the Royal Commission designates the chairman. The state pays from one fourth to one third of the deficit in the budget of each school. The total expenditure for such purposes from the capital is \$10,000 to \$12,000 annually. Tuition is \$3 to \$5 for all-day instruction throughout a three-months course, \$2 to \$3.50 for morning or

afternoon instruction during a quarter, and corresponding rates for a lesser period. Sewing machines are sometimes rented.

The program of the Stuttgart school (under the control of the "Swabian Women's Union," and with city and state subsidy) includes the various features of the following subjects: plain sewing, mending, machine stitching, dressmaking, pattern cutting, industrial work, embroidery, geometrical drawing, free hand drawing, industrial art drawing, pedagogy, and methods. This school, like the one at Reutlingen, prepares candidates for the state examinations for instructors in women's handiwork. Three kinds of state certificates are issued: (1) the lower certificate, qualifying for the giving of instruction in the women's handiwork subjects and in the required drawing connected therewith, in the middle schools and higher girls' schools; (2) the higher certificate, admitting to teach in the "women's work" schools; and (3) the certificates issued for the special subjects, dressmaking, embroidery, and drawing, and available in the "women's work" schools. The higher and special examinations come under the jurisdiction of the Royal Commission, whereas the lower certificate test is supervised by a representative of the Educational Ministry. Candidates for the higher certificate and the special certificate in dressmaking must show proof of having spent two years in preparation since obtaining the lower certificate, and those examined for the special certificate in embroidery and drawing must give evidence of a further twelve-months study in addition to the above. For the lower certificate examination, the candidate must be at least eighteen years of age, and is required to pass satisfactorily in all the details of the following subjects: practical skill in knitting, crocheting, stitching, hemming, underwear manufacture, mending, linen-marking, and simple machine stitching, drawing of plain ornament, German composition, arithmetic, and methods in the teaching of handiwork. The subjects of the higher examination are: fine sewing, machine stitching, dressmaking, lacemaking and embroidery, geometrical and free-hand drawing, and German composition. In each examination there is an oral quiz on the practical work. The special certificate in dressmaking is issued after a satisfactory showing in the details of designing and the making of the more difficult costumes. Likewise the test in special embroidery and drawing requires an expert knowledge

and practical skill in these lines as applied to the general field. In drawing, for instance, the history of art, method in the teaching of drawing, and the theory of ornamentation are added to the previous stipulations. The scholastic requirements are low. The salaries of instructors in women's handiwork appear to be very moderate. In Cannstatt, for example, the instructors in the "women's work" school commence with an annual salary of \$240. The present head of the school is paid \$360, and the highest salaries possible in this locality are \$360 for regular instructors and \$410 for the principal. In the "industry school" work in the heart of Stuttgart salaries appear to be about \$25 less for corresponding positions.

Of the mono-technical schools under the higher supervision of the Central Bureau for Industry and Commerce, by far the most important is the Technicum for the Weaving Industry, at Reutlingen. Its purpose is to furnish opportunity for the thorough theoretical and practical training of textile experts, manufacturers and factory superintendents, pattern designers, and master workmen in spinning and weaving, as well as to familiarize workers in the textile industry with the best machines for use in textile manufacture, and their care, and to afford to young merchants the training essential for the buying and selling of raw materials, yarn and other goods. The buildings are the property of the commune of Reutlingen. The direct supervision is in the hands of the Reutlingen Weaving Association, and is exercised through a supervisory council consisting of members of this body and the director of the schools.

The South German Cotton Manufacturers' Association takes a lively interest in the welfare of the institution, and is represented on its board of trustees, to which belong also the mayor of Reutlingen, the president of the Central Bureau, and the chairman of the local weaving association. From 140 to 150 students are constantly in attendance. The faculty numbers nine regular instructors, including the director, who also lectures at the *Technische Hochschule*, and there are besides seven master workmen to assist in the giving of instruction. The institution is in full operation from 7 to 12 M. and from 1 to 6 P.M.

At the disposal of the students is a fine technical library, and a remarkable collection of materials and models that is kept

up-to-date through close relations with the State Industrial Museum at Stuttgart. Frequent class visits to shops and factories, and the opportunities of the Reutlingen Industrial Improvement School for the study of modern languages, natural science, mathematics, and commercial branches, afford special facilities for study. Students entering must be at least 16 years of age, with a previous education equivalent to that of the common school. October is the usual entrance month. The courses given are:

(1) Spinning, one year; theoretical and practical instruction in the spinning of cotton and woolen goods. Tuition, \$60 for German citizens and twice as much for foreigners. An extra half-year, for Germans only, requiring three years' practical experience for entrance, is given as a "master's course."

(2) Weaving, one half-year theoretical, and one half-year with practical application. The second semester, open only to Germans, presupposes three years of practical work, and is intended for weaving masters. The two half-years may be taken at once by those who have finished the course in spinning. Tuition same as above, but doubled if two semesters are combined.

(3) Operation. A course of one year, the first half theoretical, dealing with materials, etc., the second half with practice in the operation of looms, etc., and with knitting. Tuition as above. For Germans there is a further three-months course in practical work.

(4) Pattern designing. A two-years course in decorative painting and designing, with practical application to the weaving industry, with instruction as to use of machines, and other necessary details. Those students in the spinning, weaving, and operation courses are given instruction in mechanics, the use of machines, mechanical drawing, and textile chemistry, as well as in the various subjects which come more directly within the sphere of their courses. All students are instructed in raw materials, and have access to the technological laboratory. Certificates are issued upon examination at the end of each year. Students pay \$10.75 to \$17.85 per month for private board and lodging. The state contributes about \$10,000 annually to the support of the Technicum, and the city of Reutlingen pays the greater part of the remaining deficit. The weaving

association markets the products of the shops in so far as they are salable.

Several other weaving schools of lesser grade, and confined more closely to one branch of the industry, are under the protection of the Central Bureau. They are intended rather as apprenticeship schools and pay especial attention to the development of local industries. Attended by from twenty to ninety pupils each year, they receive annual appropriations from the Central Bureau of from \$110 to \$2400 (besides machinery and materials) and are located at Heidenheim (handloom weaving of cotton), Laichingen (linen damask industry of the Swabian Alps), Sindelfingen (Jacquard weaving of cotton) and Sontheim (weaving workshop for production of smooth linen cloth). Wolfschlugen, near Stuttgart, has an embroidery school under similar control, for the development of the household industry in hand embroidery, for which the locality is famous. Likewise the lace-making school at Koengen receives state support. Several small industrial schools of similar purpose are entirely in the control of merchants, societies, and private individuals, without aid from the state; such, for example, as the Laichingen School for Hand and Machine Embroidery, under the auspices of a stock company, and the South German Tailoring Academy in Stuttgart.

At the town Schwenningen, situated in a section of Wuerttemberg that is almost enclosed by Baden and which lies not so very far from Switzerland, is the Technical School for Skilled Mechanics, which includes courses in watch- and clock-making and electro-mechanical work. Unlike the other technical institutions described above, this is a purely state school. Here the ordinary conditions are reversed, and the commune pays the state a yearly appropriation of about \$500 toward the maintenance. When the building was first erected and equipped the commune paid over to the state \$13,090, and a Schwenningen merchant contributed \$2400 toward the enterprise. The annual appropriation of the state is about \$9000. The school was established in 1900, and has grown rapidly (about seventy pupils now). It takes the place of apprenticeship. The aim is to prepare skilled workmen, foremen, and independent industrialists in the various branches that come within its scope. A further unique feature is that the institution is also destined

to furnish the Central Bureau expert advice and reports, and duplicate models—all to be used for the promotion of the industries concerned, in Wuerttemberg.

The faculty consists of the director, one other principal instructor, three assistant teachers, and four master workmen. These with the mayor and two representatives of industry make up the local school committee. Instruction is given in a three years course, and an additional improvement course of one year for those who already have the journeyman's certificate, and who have done practical work for at least two years. Entrance to the first year of the regular course is by examination. Candidates are required to be at least fourteen years of age and to have completed a course of training equivalent to that of the common school. The final examinations of the first and second years are the entrance tests for the succeeding terms. The examination at the end of the third year gives to the successful candidates (11 skilled mechanics and 4 watchmakers in 1906) a certificate permitting them to undertake the direction of apprentices, and the final examination for the improvement course is equivalent to the state test for master workmen (4 skilled mechanics successful in 1906). Tuition, \$6 annually for Germans, \$24 for foreigners. "Guests" and "listeners" are also admitted to certain courses, by paying the fee. The total cost of board, lodging, and school tuition and expenses for a German resident is from \$95 to \$167 per annum. The school begins in May, Summer holidays are August 15 to September 15. Nearly all the materials used in the school are furnished gratis to the pupils. The products of the institution are retained by it. (Further description and the program omitted).

The Technical School for the Book Printing Trades, at Stuttgart, is under the auspices of the Union of Proprietors of Book Printing Establishments in that city, but receives about \$500 yearly from the state and the municipality respectively. The balance of an annual expenditure of some \$2500 is borne by the Union. Tuition fees are \$3 per annum for apprentices—one half of this to be paid by the employers. The members of the Union have obligated themselves to send their apprentices to this school. Others may attend also. The school is not destined to take the place of apprenticeship, but to complete and augment the practical shopwork. It is attended chiefly

by pupils in the third and fourth years of their apprenticeship, since during the first and second years they attend the printing division of the City Industrial School. Courses are given in the Technical School on two evenings of the week, from 6 to 8 or from 7 to 9. There are about 108 pupils, almost equally divided between the sections for typesetting and for presswork.

The Apprenticeship Workshop for the Tanning Industry (1906), at Metzingen, is intended to take the place of apprenticeship and to prepare foremen for this vocational field. The special instruction has been arranged for in connection with a private industry, and it is left to the head of that industry to furnish the necessary materials and to sell the product. The course is three years in duration, but the theoretical instruction of the first two years is given in connection with the local industrial improvement school. The state makes an annual grant of \$1700.

The Technical School for the Working of Precious Metals, at Gmuend, is the creation of the present year (1907). It has some of the features of an industrial art school. As at Schwenningen, the greater part of the product will be kept for exhibition purposes. The most of the remainder will be remelted. Like the other special technical institutions this is a day school.

The sale of the products of the various state schools, on the whole, amounts to very little. There is not much opposition to such sale, on the part of unions or employers. In the interest of the schools the product must constantly change in character, so as to give diversity of experience to the students. This action forestalls any possible wholesale production. There is no objection whatever to the sale of objects made by hand.

To complete the list of lower industrial schools under the Central Bureau, it is only necessary to add the names of the Practical Engraving School at Heilbronn and of the Winter Building Trades Schools at Biberach and Heilbronn, which still form a part of the industrial improvement schools of those localities. Some industries not represented by a school are nevertheless aided by means of special courses given through the agency of the Central Bureau. The carriage industry is unimportant in Wuerttemberg. There is no school for shoemakers, but courses of about four weeks' duration, eight hours per day, are given to master-workmen and to the older journeymen in such centres

as Ulm and Stuttgart, and especially at Tuttlingen. There is no tuition fee. The pupils furnish the materials. There is no machine work, although instruction for the prevention of accidents is a part of the course.

There are a few private industrial schools in Wuerttemberg in connection with large corporate industries, and wholly maintained by the proprietors, on the plan of the schools of R. H. Hoe & Company or of the National Cash Register Company of this country. Such, for example, is that of the Daimler Automobile Company at Untertuerkheim. The plant here employs 3000 men, and is reputed to be the greatest of its kind in Germany. At Esslingen the *Maschinenfabrik* also has its own school. Likewise the *Metalfabrik* of Geislingen and the Bruderhaus Furniture Factory at Reutlingen. No extended theoretical courses are given by the private industrial institutions.

Not content with the work of the vocational schools alone, the Central Bureau has for many years devoted much attention to the giving of special industrial courses in the chief centres of technical activity. Historically, the plan is very old in Wuerttemberg. Over fifty years ago, travelling instructors were sent out to give courses in handloom weaving, of two months' duration, in the localities where this industry had attained some importance. About ten years later chemical courses were established here and there for metalworkers and soapmakers. During the last ten years a great many "theoretical-technical" and "practical-technical" courses on the plan of Baden's have been conducted throughout Wuerttemberg by the agency of the Central Bureau. Also, industrial art courses and instruction for the building trades, for master-workmen, are under its auspices. Among others, "practical-technical" courses are given in the following branches; hand-gilding, horse-collar making, interior decoration, shoemaking, cutting, graining, marbled binding, electrical and interior installation, cabinet-making, bookbinding, tailoring, watch-making. The courses are from three to twenty-one days in duration (eight hours per day), and are open only to those already possessing considerable skill in the special branch. The instructors are exceptional master handicraftsmen or professional teachers. The "practical-technical" courses cost the state in the neighborhood of \$1300 yearly, with the addition of

about \$700 for stipends to those attending. The duration of the courses is not as long as it is desirable to have them from the point of view of the instruction, but considering the needs of both workmen and employers the golden mean has been chosen. In Austria, the work of this kind is carried on for from six to eight weeks, and in such cities of Germany as Hanover and Cologne the Austrian model has been imitated. In Wuerttemberg, up to the present, it has seemed impracticable to lengthen the courses.

The "theoretical-technical" courses are given on holiday afternoons, and not, like the "practical-technical" work, throughout successive day periods. In one branch of the work, the different industries have been taken up in successive years, and the instruction is given to the élite of each type: soapmakers, metalworkers, house painters, photographers, coopers, and distillers, brewers, bakers, builders, decorative painters. Special chemical courses are also established. Industrial art for decorative painters is taught. Courses for janitors and building superintendents are given.

Under the Central Bureau there are also courses for teachers, master-workmen, and merchants, in industrial bookkeeping. These are continuous throughout ten or twelve days.

A considerable number of industrial courses are conducted under the auspices of unions. The Central Bureau aids by paying about one-third of the deficit after tuition and donations have been applied toward the expenditures. About a dozen courses are established annually by the Central Bureau in the manner of conducting handicrafts associations, with especial attention to the importance of such unions for the industries, instruction in bookkeeping, etc.

Annual stipends paid out by the Central Bureau for attendance at industrial schools in various localities amount to about \$1000.

There are in Wuerttemberg eight boards of trade (*Handelskammern*) and four great handicrafts boards of industry (*Handwerkskammern*), at Stuttgart, Heilbronn, Ulm, and Reutlingen, the boards of industry representing over one hundred unions of small industrialists scattered throughout the kingdom. The boards of industry, organized by the state, have fixed upon

three years as the usual term of apprenticeship. Since 1899, in imitation of Baden and Switzerland, the state has supported a number of apprenticeship workshops, in connection with various industries, and largely equipped with up-to-date tools and machinery through the Central Bureau. There were 185 such workshops in 1905, with 201 apprentices, representing 27 industries as diversified as could well be imagined. The state expends \$3000 per year for the upkeep of the workshops, and besides furnishes an inspector, the "travelling instructor." The master-workman having a state-aided apprenticeship workshop must give board and lodging in his own household to the apprentice, and must not require many errands outside of the regular work in the industry. He must instruct the apprentice and demand good conduct and regular attendance at church. Each increase in the number of apprentices must have the approval of the Central Bureau. Samples of work must be furnished to the Central Bureau each year for the exhibit at Stuttgart. Prizes are given. Over 800 apprentices take part annually in the exhibit—all, except those having the privileges of the state-installed workshops, of their own volition. In order to be eligible the apprentice must have worked at the industry for at least nine months. Between 50 and 60 industries are represented each year, and the exhibits are carefully inspected by about 10,000 interested persons. The industries having the greatest number of exhibits are usually those of the cabinet-makers, locksmiths, mechanics, painters, smiths, barbers, braziers, wagon-makers, tailors, turners, bookbinders, wood-carvers, coopers, saddlers, and shoemakers.

At the end of his apprenticeship the young workman is obliged to take the examinations in industrial (or commercial) subjects and to produce a specimen of his handiwork. The yearly cost of the latter test amounts to about \$8000. Of this sum the state contributes something over \$2000 each year. The remaining cost is borne by the boards of industry. The latter receive an appropriation from the state (for administrative purposes mainly) of \$5000 annually.

In choosing a trade, the tendency in Wuerttemberg, as in all Old World countries, is to follow in the footsteps of the parent. However, advice is usually sought from the head of the local improvement school, who is kept informed as to the needs of

the country by the Central Bureau, or from the head of a special school, the "travelling instructor" or inspectors. No country has a better system for keeping tab on the new demands that arise in industry and commerce and communicating its findings to the localities.

For the further dissemination of industrial instruction and of news in this domain the Central Bureau issues a weekly periodical, *Das Gewerbeblatt*, which reaches 12,000 subscribers and is on file in every workmen's club or industrial headquarters in the land. It is a most useful publication, in close touch with the needs of the country through the state inspectors and the representatives of unions and boards of industry who are its contributors. The yearly cost of the journal is only \$.24 in clubs of three or more. The state pays the annual deficit of about \$5000 for its publication.

One of the most important agencies of industrial instruction under the Central Bureau is the "travelling industrial instructor" (*Wanderlehrer*). This official gives about seventy lectures in the various centres annually. He inspects the apprentice workshops, takes notes of the use to which they are put, and determines what additions of machinery, tools, or exhibit material are necessary. He is the advisory agent and industrial barometer of the Central Bureau. He helps to arrange the state exhibits of apprenticeship work, supervises the courses for master-workmen, and in some cases himself gives instruction. On invitation he meets with the unions, and at all times urges them to give special industrial courses for master-workmen and for industrial teachers, and furnishes information as to the available special instructors. He investigates household industries, writes weekly for the state industrial journal, and is altogether as busy as a man could well be. For his expert services in this country the state pays only \$1800 annually.

Besides the magnificent State Industrial Museum at Stuttgart, under the direct management of the Central Bureau, there are four other industrial museums in Wuerttemberg receiving some aid from the state. These are the Special Industrial Museum for the Fine Metal Industry, at Gmuend, and the industrial museums of Ulm, Spaichingen, and Heilbronn. The remarkable thing about any and all of the Wuerttemberg industrial museums is the fact that they make a strong point of the best in up-to

date industrial methods, use of material, and workmanship; and, while they are repositories of much that is classic, they appear to have purposely neglected those exhibits which have chiefly an antiquarian rather than a practical interest.

Other aid in the direction of industrial betterment afforded by the Central Bureau includes the following: (1) Books are loaned from the library of the State Industrial Museum to local libraries and to unions, or are purchased outright for them by the same agency; (2) free technical advice is furnished (especially to builders); (3) the instructive yearly reports of the Wuertemberg boards of industry are published and given a wide circulation; (4) tests of boilers and engines are made gratis by the engineering laboratory of the technical college, through the aid of an appropriation granted by the Central Bureau; (5) new and valuable models and patterns are made known to the various industries through illustration and description in the industrial journal of the state, or by advertisement; (6) local industrial expositions are arranged for, and the state takes part in foreign expositions of the kind; (7) large stipends are afforded for the visiting of foreign industrial expositions; (8) grants are made for the stimulation of industries, or for their introduction (recently these have been fewer and smaller); (9) travelling stipends are allotted, especially for the visiting of the industrial exhibits at Stuttgart, Karlsruhe, Munich, and other places easily reached, and also for trips to Paris, London, and America; (10) medals are given for long and efficient service in industries (in 1904 bestowed upon 110 industrial workers); (11) finally, there is an extensive industrial inspection system costing \$18,000 per annum, and (12) the work of collecting and publishing industrial statistics.

In this abbreviated report, the crowning glory of the Central Bureau, mentioned frequently in the above paragraphs, may only be given a word. I refer to the State Industrial Museum at Stuttgart. Having had occasion to visit the principal museums of all kinds at home and abroad, I know of none that is more efficient, nor which houses more diversified and helpful activities held together by one consistent and unique purpose—the universal instruction and industrial betterment of the people. The entire range of industrial propaganda discussed above has its effective headquarters in this building, and it

manifold functions are co-ordinated and made mutually helpful through the Central Bureau. Though established in a magnificent new building, and now as always making much of the display of latest productions in the realm of industry and industrial art, this museum is in reality the oldest of its kind in Germany (1849), and its pedagogical exhibit is the oldest permanent display of the sort in existence anywhere. An inspection of the museum soon convinces that the central thought governing its organization and management is the application of the best ideas of both past and present to present needs. It is a rare illustration of what a live and vital institution a museum can be. The collections are chiefly concerned with raw and partly manufactured materials; the chemical industries; in dustrial and industrial-art objects from the precious and baser metals; pottery, glass and crystal ware; furniture, and interior decoration; clocks and musical instruments (if anything more artistic and poetical than the special music room has been caught in wood or metal, I have not seen it); wood and ivory carving; work in leather; bookbinding and artistic books; the graphic arts; weaving and knitting, laces, embroidery; carpets and tapestries; power and hand machinery; devices for protection against accidents; instruments of precision; weapons; electro-technical machinery and apparatus; models in the greatest variety.

Especially important is the collection of textile materials, French and English weaving patterns, etc.—300,000 samples, catalogued and indexed. There are about 10,000 Chinese and Japanese industrial art objects, selected with rare discernment. An interesting collection is that of the Black Forest wall clocks (“grandfather’s clocks”) of various periods. There is, besides, one of the best collections of watches in the world, and an equally valuable collection of building materials. For the business man or the student of industry there are 100 directories from all over the world, about 500 catalogs of expositions, and 10,000 price lists arranged according to industry and country. A vast number of art models in plaster serve for the industrial art schools throughout the country. They are manufactured in the building. There is no charge for admission to the museum, free guides are furnished, and Wuerttemberg industrialists may have the services of experts without

cost. The library is a well chosen collection of technical material, consisting of 75,000 bound volumes and 55,000 pamphlets. The library department is classed in five divisions: science, art, collection of photographic art material, educational museum with especial reference to the industrial and commercial improvement schools, and the reading-room for industrial newspapers and magazines (300). The chemical laboratory, with its three or four experts constantly employed in making tests of raw materials, etc., for the various Wuerttemberg industries, is worthy of more than passing notice. The popular chemical courses given in the lecture room of the museum prove invaluable to the pupils of the City Industrial Improvement School, and to the other individuals who are admitted. It is the application to industry that is always emphasized here.

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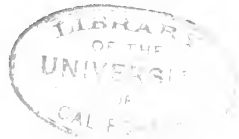
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